OCTOBER, 1955

American Engineer

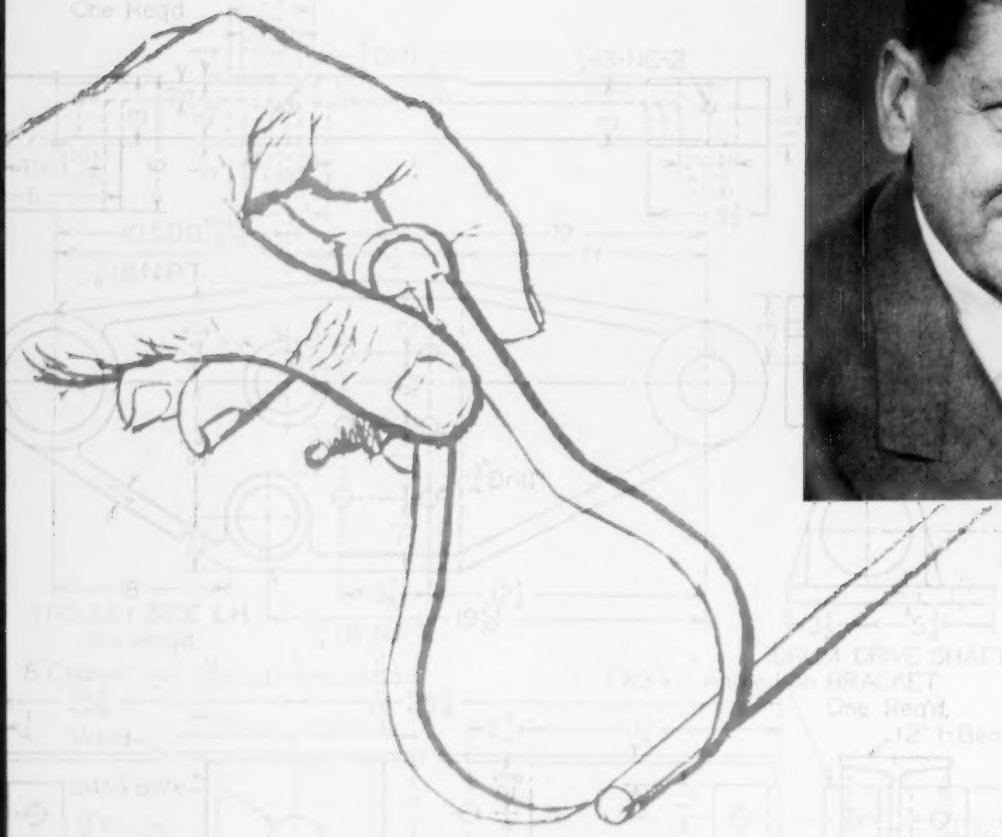
IN THIS ISSUE . . .

Skill in Depth: the Answer to the Manpower Problem

By

JAMES P. MITCHELL,
Secretary of Labor

Secretary Mitchell

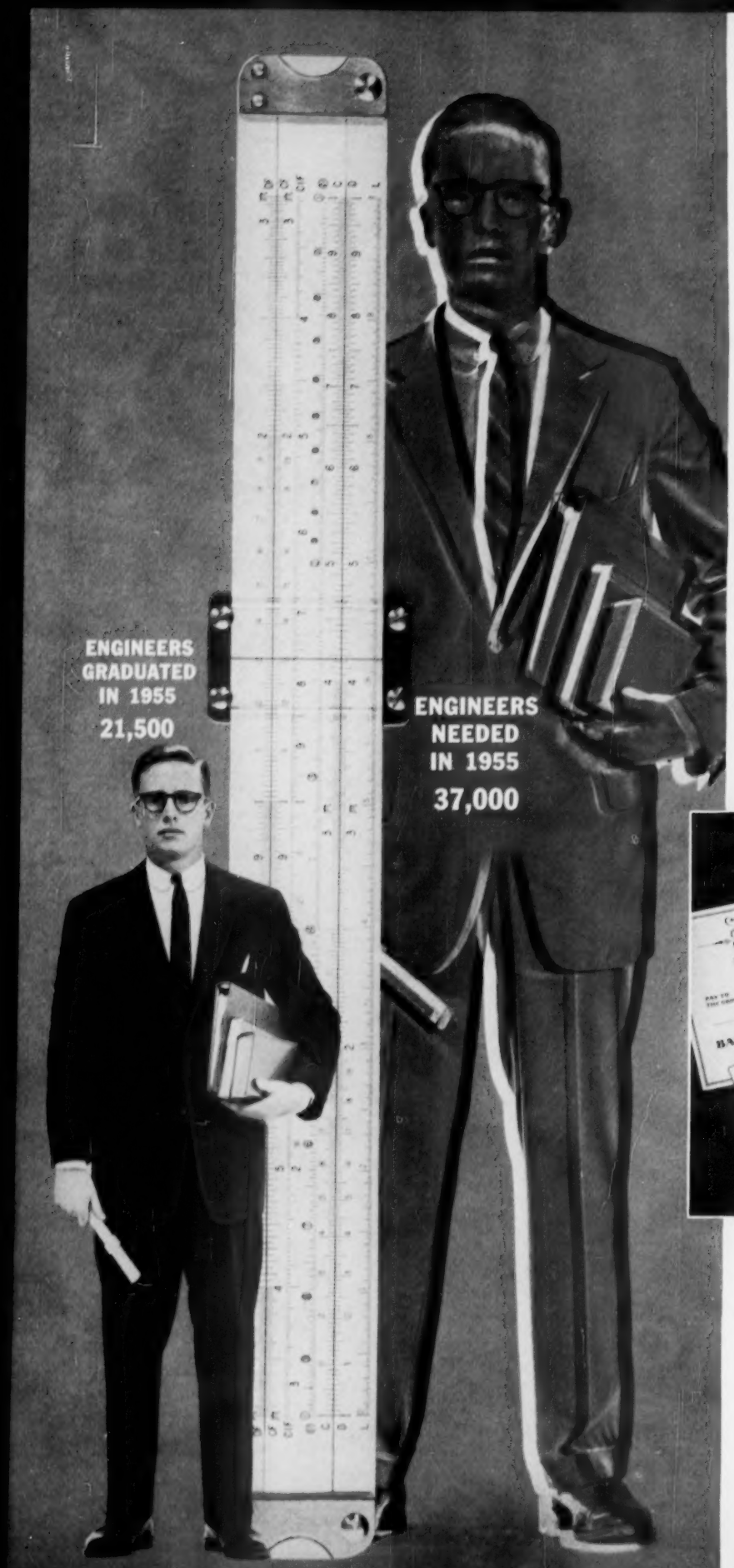


Beginning An Important New Series: **So You Want to Open a Consulting Office**

Let's Take Warning from History by NSPE President Allison C. Neff, P.E.

Plus: **From Washington ● News Briefs ● Professional Comment**

EUGENE B POWER
UNIVERSITY MICROFILMS
313 NORTH FIRST ST
ANN ARBOR MICH
COUP T 71555



AS GENERAL ELECTRIC SEES IT...

Here are 5 ways to

For every 5 new engineers industry needed this year, there were only 3 graduated from U. S. colleges

In 1955, U. S. industry had jobs for an estimated 37,000 engineers; our colleges graduated 21,500.* This shortage, typical of recent years, is creating an increasingly serious problem — for engineers and scientists hold the key to progress in this swift-moving technological age.

At General Electric, for example, nearly 17,500 of our people are trained in engineering or science, and we have opportunities for a thousand more technically trained people each year. The need may double in the next 10 years.

As we see it, industry, working with educational institutions, can do much to solve the shortage. On these two pages are some of the things we believe will help:

*Estimates are from the Engineering Manpower Commission of the Engineers Joint Council.

3. Help schools financially. Nearly half of U. S. colleges operate in the red. Since 1922, G.E.'s aid-to-education program has included fellowships, scholarships, and other financial support. In addition, the General Electric Educational and Charitable Fund matches, dollar for dollar up to $1,000 a year, contributions by each employee to his college

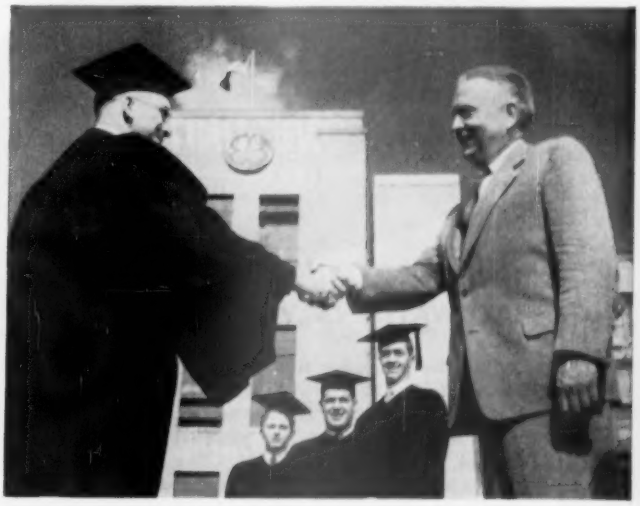
For a detailed discussion of our views on "Basic Relations Between Education and the Economy," write General Electric, Department AA2-119, Schenectady, New York.

help solve America's critical shortage of engineers

1. Help guide young people's careers. More high-school students will take the courses they need to become engineers if they know of the wide opportunities in the field. Since the 1920's, General Electric has tried to create interest by distributing a variety of school training aids. (Above, a teacher counsels students, using a G-E career guidance booklet, "Why Study Math?") In the past 10 years, schools have requested 63,000,000 copies of our training aids.

2. Bring businessmen and educators together. An understanding of the role math and science play in business can help teachers prepare students for careers. The group above is the latest of 1,450 high-school teachers to attend G.E.-sponsored summer fellowship programs. Here they have the opportunity to study at several leading colleges and to see firsthand the value of their work to business. We have also conducted conferences for college educators since 1924.

4. Educate employees on the job. The development of young people must continue after they start to work. At General Electric, we have 12 formal educational programs; the oldest — Engineering — was started nearly 60 years ago. (Above, Clarence Linder, Vice-President — Engineering Services, reviews work of engineers enrolled in our Creative Engineering Program.) More than 10,000 technically trained men and women have participated in these programs.



5. Encourage self-development. Young people with aptitude should be helped to move ahead. For example, the young men above joined our Apprentice Training Program as high-school graduates in 1949; this year they are graduate engineers from the U. of New Hampshire after a 6-year work-and-study program sponsored by our Meter Department. Donald E. Craig, General Manager of the Department, congratulates the men and welcomes them to full-time jobs.

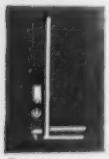
Progress Is Our Most Important Product

GENERAL ELECTRIC

YOU BENEFIT...
by over 50 years of experience

Shown is Uplifter loading highway truck.

Revolvator Uplifter Portable Elevator. Multiple use, multiple purpose Revolvator Uplifters, products of 50 years of engineering know-how solve handling problems throughout all industry. Ideal for shop usage, Revolvator Uplifters also speed handling in the shipping department with equal efficiency. The Uplifter is ideal when no shipping dock is available. Electrically-powered Uplifter portable elevators are available in either "plug-in" or battery operated models. Write for information.



Revolvator Uplifters: 1000 lb. and 2000 lb. capacity. Also dual capacity hand-operated models.

REVOLVATOR CO.
8702 Tonnele Ave., N. Bergen, N. J.

Letters to the Editor

Reserve Forces Act . . .

Dear Editor:

Assistant Secretary of Defense Carter L. Burgess has asked me to express his appreciation for the kind remarks appearing in the article, "Engineers and the Reserve Forces Act of 1955," in the September 1955 issue of *The American Engineer*.

We are busily engaged in implementing the various portions of this important piece of legislation. As you realize, it has important implications for engineers and other persons with critical skills.

The discussions which have taken place between representatives of the National Society of Professional Engineers and my office concerning the implementation of the law have been very helpful to me and I trust beneficial to the Society.

ALBERT KAY, Director,
Office of Manpower Supply,
Department of Defense,
Washington, D. C.

Definitions . . .

Dear Editor:

I have just received, and read, my copy of the August issue of the *American Engineer*. I was very interested in the letters from Engineers Iberg and Wood as published on page 4. On the humorous side, I recently heard of a "Personal Appearance Engineer," which turned out to be a beauty parlor operator. You well know of many other flagrant violations of the term "engineer." I receive mail, even from engineering publications, addressed to Mr. Earl F. Dunkle, P.E. I wonder what AMA would think of its members being addressed as *Mr.* John Doe, M.D.?

I think Wood has a good point in his suggested "Professional Designation." Iberg has a better idea to legislate, and promote *public education* as to the true meaning of engineer. Unfortunately, we do not assess enough dues to permit such a program.

I have seen numerous advertisements for "engineers" by some of the largest corporations in our country. Out of curiosity I have 'phoned a few (without identifying myself) and asked if they really wanted *engineers*. The answers were evasive, but it usually wound up that all they wanted were some cheap hired hands.

E. F. DUNKLE, P.E.,
Kansas City, Mo.

$ the Answer . . .

Dear Editor:

I have just finished reading your September, 1955, issue of the *American Engineer* and I note there is considerable discussion concerning the lack of qualified students for entering engineering school and also about the shortage of engineers in our United States, as compared to Russia.

Since both subjects deal basically with the shortage of engineers, a common solution should exist. This deals with one of those solutions.

I have had some contact with high school students and they seem serious-minded as to their future vocations. Naturally, salary enters the picture and I think when you consider engineers' salaries as compared to medical, dental or legal professions we are quite far behind.

According to a recent survey conducted by Northwestern University, their liberal Arts and commercial graduates, five years after graduation make more money than the corresponding engineering students.

Is it any wonder then that recent graduates go to "greener pastures" for their future instead of struggling through four and often five years of difficult engineering school? Gentlemen, better salaries are still one of the best ways for attracting more potential engineers to our field.

(Name withheld by request.)

A PE Is— . . .

Dear Editor:

Mr. Arthur M. Wellington (1847-1895), defined an engineer as "a man who can do that well with one dollar which any bungler can do with two after a fashion."

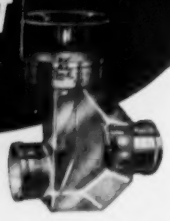
Hardy Cross says: "engineering is the art of planning for the use of land and air, and for the use and control of water; and of designing, building and operating the works and machines needed to carry out the plan."

Herbert Hoover says: "It is a great profession. There is the fascination of watching a figment of the imagination emerge through the aid of science to a plan on paper. Then it moves to realization in stone or metal or energy. Then it brings jobs and homes to men. Then it elevates the standards of living and adds to the comforts of life. That is the engineer's high privilege."

These great engineers propound different definitions. I believe it would be helpful to the profession to print this letter inviting engineers to send in their ideas. The word engineer is kin to words which imply more than is contained in any single definition: engine, ingenious, genius, Jinne (of Arabian Nights), generate, and generous. The word seems to say that engineering is concerned with creating something. Is there a definition that clearly states

(*Continued on page 47*)

AUTOMATIC SWING CHECK VALVE
AND MANUALLY OPERATED GATE
ALL IN ONE UNIT



BOOSEY NO. 109
BACKWATER VALVES

Designed for installation at floor level or lower without pit, Boosey No. 109 Backwater Valves automatically close when flood conditions exist. A bronze automatic swing check valve and a manually operated gate valve—all in one unit—are enclosed within a cast iron body. Other important Boosey features include: non-rising stem, spade-shaped gate, bronze swing check valve.

SEND FOR A COMPLETE BOOSEY CATALOG

It's the easy way to specify the exact drainage specialty!

NORMAN BOOSEY MANUFACTURING COMPANY
General Sales Office, 5281 Avery Avenue, Detroit 8, Michigan

BOOSEY

American Engineer

OCTOBER

1955

American Engineer
21st YEAR OF PUBLICATION
1925 – 1933

Kenneth E. Trombley, Editor

Mary Margaret Milbrath, Assistant to the Editor

Vincent F. Waters, P.E., Chairman, Publications Committee, NSPE

•

N.S.P.E. Officers

Allison C. Neff, P. E., Pres.
Post Office Box 170
Middletown, Ohio

R. J. Rhinehart, P. E., Vice Pres.
Arkansas Power & Light Company
Pine Bluff, Ark.

Louis F. Frazza, P. E., Vice Pres.
225 Bamford Avenue
Hawthorne, N. J.

Virgil E. Gunlock, P. E., Vice Pres.
Post Office Box 3555
Chicago 54 Ill.

Warner Howe, P. E., Vice Pres.
76 Porter Building
Memphis, Tennessee

Lindley R. Durkee, P. E., Vice Pres.
448 Federal Office Bldg.
909 First Avenue
Seattle, Wash.

Garvin H. Dyer, P. E., Vice Pres.
c/o Missouri Water Company
123 West Kansas Street
Independence, Mo.

Clarence T. Shoch, P. E., Past Pres.
901 Hamilton Street
Allentown, Pa.

Russell B. Allen, P. E., Treas.
4610 Hartwick Road
College Park, Md.

Paul H. Robbins, P. E., Ex. Dir.
1121 15th Street, N. W.
Washington 5, D. C.

•

Knowledge and timber should not be much used until they are seasoned.

—Oliver Wendell Holmes

•

BPA

Member, Business Publications Audit

• SPECIAL ARTICLES

Skill in Depth: the Answer to the Manpower Problem ... 11
Secretary of Labor James P. Mitchell. Read this down-to-earth message about the **real** shortage.

So You Want to Open a Consulting Office ... 17
First of Three parts. Consulting engineer John B. McGaughy deals with the background qualifications needed for success.

Let's Take Warning from History ... 21
Allison C. Neff, P.E. NSPE's President cautions against further splinterization of the engineering profession.

The NSPE Board of Directors, 1955-56 ... 27

• REGULAR FEATURES

Letters ... 4
Professional News Briefs ... 6
From Washington ... 15
Professional Postscripts ... 24
NSPE Believes ... 26
Strictly Business ... 36
With Our Members ... 37

New Processes ... 34
Professional Directory ... 38, 39, 40, 41
New Literature ... 45
Classified ... 47
What's New ... 48
Advertisers' Index ... 50

ADVERTISING INFORMATION:

R. A. Oliver, Advertising Director
American Engineer, 1121 Fifteenth Street, N.W., Washington 5, D. C.
Telephone ADams 4-1622

NEW YORK:
Austin LeStrange Co., Inc.
420 Lexington Avenue
New York 17, N. Y.
MUrray Hill 5-3277

CHICAGO:
LeStrange Co., Inc.
185 North Wabash Ave.
Chicago 1, Illinois
DEarborn 2-0248

LOS ANGELES:
J. W. Conrow & Co.
1175 Woodbury Rd.
Pasadena, Calif.
SYcamore 7-5365

The American Engineer is published monthly by the National Society of Professional Engineers, 1121 15th St., N. W., Washington 5, D. C. Entered as Second Class Matter at the Post Office, Washington, D. C., under act of March 3, 1879. Copyright, 1955, by the National Society of Professional Engineers. Not responsible for opinions expressed in signed articles. Subscription Rates: $2 per year in advance to members of NSPE and its Affiliated Societies: $3 per year in advance to non-members in U. S. A. and its possessions, Canada and Mexico. Foreign, $4 per year. Single copy, 35c. Vol. 25, No. 10.

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS
FOUNDED 1934

PROFESSIONAL NEWS IN CAPSULE FORM

A Roundup of Late Events for Professional Engineers

Col. Bingham Retires From N. Y. Transit Post

Col. Sidney H. Bingham, executive director and general manager of the New York City Transit Authority, has announced that he plans to retire from the city post to enter private consulting practice. A prominent member of the New York State Society of Professional Engineers and NSPE, Col. Bingham has been associated with the New York subway system for thirty-nine years.

His retirement will be effective officially on February 1, 1956; but in accepting it, Charles L. Patterson, chairman of the New York City Transit Authority, indicated that arrangements have been made so that Col. Bingham will be available as a consultant to the Authority, both on projects in the current program as well as in plans for the future.

In an editorial in the *New York Times* paying tribute to Col. Bingham it was stated, "As nearly as anyone now on the scene he could wear the title of Mr. Subways."

"Colonel Bingham," the editorial continued, "has been a man never to consider personal comfort or convenience when it was necessary to get on top of the emergencies that come daily or even hourly with running a great railroad. . . . His career has included service to this country and foreign governments that sought his engineering advice. He well deserved the words of appreciation voiced by the Transit Authority and its tribute to his devotion to duty.

"He has carried a heavy burden of responsibilities in a job where brickbats usually outnumber thanks. But it is only necessary to remember the millions of passengers safely and swiftly carried for millions of miles through the years to know that management and the men who work with it deserve a hand for work well done."

ASSURE ACCURACY
REDUCE COSTS
by using
WARREN-KNIGHT
TRANSITS and LEVELS

Special features of design and construction assure the greatest value per dollar of investment.

A MODEL FOR EVERY NEED — 10 DAY TRIAL

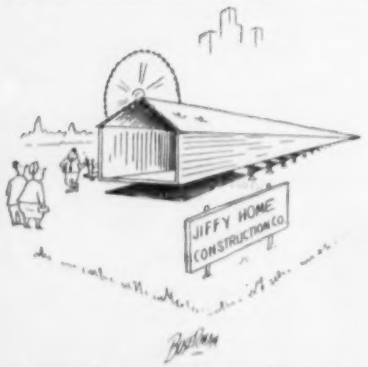
SERVICES FOR THE ENGINEER
Instruments—New or Rebuilt
Engineering Equipment and Supplies
Rental—any length of time
Repairs—any make
Assistance—by P.E. in making your selections

Send for free Information AE-510

WARREN-KNIGHT
136 N. 12th St., Phila. 7, Pa.

U of Penn. Symposium Set

One hundred years of engineering instruction at the University of Pennsylvania will be marked by a "Centennial Symposium on Modern Engineering," scheduled for Friday, November 11, according to Dr. Carl C. Chambers, vice president for engineering affairs. Leading engineers and engineering executives from various industries will participate.



"About how many rooms, folks?"

Dr. Bellinger Leaves For Egypt Assignment

Dr. Frederick Bellinger of Atlanta, chief of the Chemical Sciences Division of the Georgia Tech Engineering Experiment Station, has left to undertake a United Nations assignment in Egypt.

Dr. Bellinger, who is a member of the Georgia SPE and NSPE, will advise and assist the Egyptian Government in establishing an industrial research program by arrangement with the United Nations Educational, Scientific, and Cultural Organization (UNESCO). He will be concerned specifically with equipping a large new laboratory facility in Cairo, organizing a research program for the laboratory, and expanding technical training at the University of Cairo.

The assignment will be for one year; and in Dr. Bellinger's absence from Georgia Tech, Dr. Wyatt C. Whitley will serve as acting chief of the Engineering Experiment Station's Chemical Sciences Division.

ASME Nominates Officer Slate

The Nominating Council of the American Society of Mechanical Engineers has announced the nomination of Joseph W. Barker of New York City to serve as the organization's next president. Mr. Barker is chairman and president of the Research Corporation, New York, a nonprofit foundation established to make grants-in-aid for scientific research, particularly to smaller colleges and universities. He is a former dean of engineering of Columbia University.

The Nominating Council also submitted the names of four men for the Society's regional vice-presidencies. They are: Charles E. Crede, vice president and chief engineer of Barry Controls, Inc., Watertown, Massachusetts; Frank W. Miller, vice president, Yarnell-Waring Company, Philadelphia; Albert C. Pasini, general superintendent of production,

The Detroit Edison Company, Detroit; and Bryan T. McMinn, professor of mechanical engineering, University of Washington, Seattle. Mr. Miller and Mr. Pasini are also members of NSPE.

Another NSPE member—Glenn B. Warren, vice president and general manager, Turbine Division, General Electric Company, Schenectady, New York—was among those nominated to serve as ASME directors for the coming administrative term. Other directorial nominees are: J. F. Downie Smith, dean, School of Engineering, Iowa State College, Ames, Iowa; Louis F. Polk, president, The Sheffield Corporation, Dayton, Ohio; Elmer O. Bergman, staff consultant, C. F. Braun and Company, Alhambra, California; and Joseph Pope, first vice president, Stone and Webster Engineering Corporation, New York City.

❁

Stevens Tech Grads Fare Well Salarywise

The results of a recent survey of the graduates of the Stevens Institute of Technology, Hoboken, New Jersey, excluding members of the classes of 1953 and 1954, show that Stevens men do very well in regard to salaries and advancement.

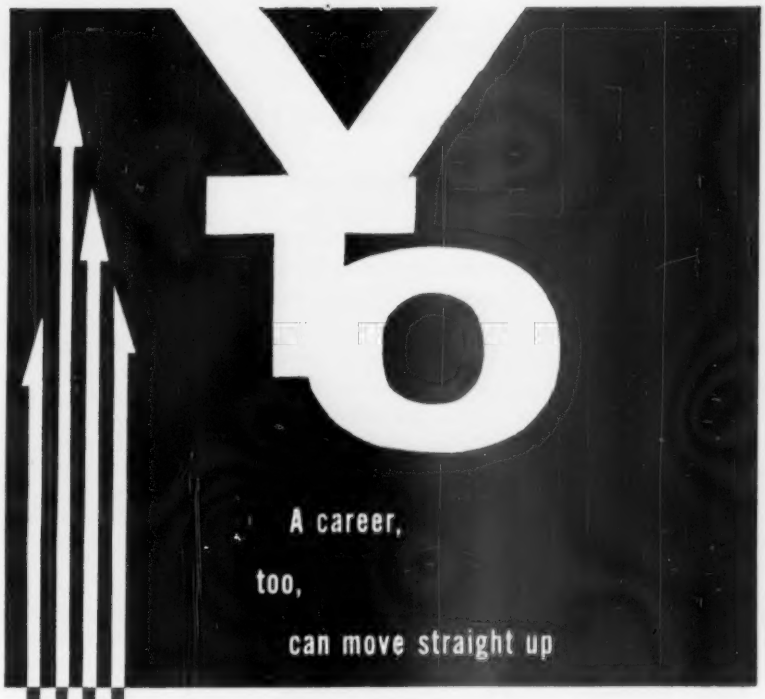
The average Stevens graduate, it was found, was earning more than $5,000 annually within three years after his graduation, and the incomes of nearly half of the men were doubled ten to twelve years later. By the time retirement age was reached, many of the graduates were receiving salaries ranging from $15,000 to $20,000 while holding policy-making jobs in industry. Some had reached as high as the $150,000 bracket.

The Stevens report showed that 19 per cent of the graduates from the classes of 1902 to 1952 are either presidents or vice presidents of firms, while 48 per cent are managers, chief engineers, research directors, and supervisors.

❁

C. Y. Thomas Takes Safety Office

C. Y. ("Kit") Thomas of Kansas City, Missouri, a former national vice president of NSPE has recently been elected president of the Kansas City Safety Council by that organization's Board of Governors. Mr. Thomas,



Specialists in VTO: Take a look at Fairchild's progress in this exciting field of modern aviation!

Here is real opportunity to make your mark in this important work, offered by the fast-growing, progressive organization that gave the world the famous C-119 *Flying Boxcar* and C-123 *Provider*. For now at Fairchild extensive research and development programs are in progress to create new VTO craft, as well as transports, fighters and missiles.

If you have experience in this field, and can make genuine contributions to its advancement, then you have an important place at Fairchild, and the chance to move straight up in your profession.

Consider, too, the added advantages of living and working close to Baltimore and Washington, in the attractive Cumberland Valley, where housing, schools and recreational facilities are among the nation's finest. And, Fairchild's salary plan, paid pensions, health, hospitalization and life insurance benefits give you extra security in which to build your future.

Send a detailed resume of your experience to Walter Tydon, Chief Engineer. All correspondence will be kept in strictest confidence, of course.

"where the future is measured in light-years"

ENGINE AND AIRPLANE CORPORATION
FAIRCHILD
Aircraft Division
HAGERSTOWN, MARYLAND

To the man who intends to do creative engineering...

AiResearch is looking for your kind of engineer.

Why we need you is evident from the type of work we do... like the development of intricate transducer-computer systems to simplify the job of flying.

We produce more than 1000 different products, from unique air-valves that can operate under atomic temperatures to the most complicated complete systems, working on the very frontier of present scientific knowledge.

Positions are now open for mechanical engineers ... electrical engineers ... physicists ... specialists in engineering mechanics ... specialists in aerodynamics ... electronics engineers ... aeronautical engineers.

AIRESEARCH AIR DATA COMPUTER SYSTEM *integrates electronic, pneumatic and electrical components to automatically sense, measure and correct for all air conditions affecting flight.*

Write to Mr. Wayne Clifford, AiResearch Manufacturing Company, 9851 S. Sepulveda Blvd., Los Angeles 45, California. Indicate your preference as to location between Los Angeles and Phoenix.

THE GARRETT CORPORATION

AiResearch Manufacturing Divisions

Los Angeles 45, California • Phoenix, Arizona

Designers and manufacturers of aircraft components: REFRIGERATION SYSTEMS · PNEUMATIC VALVES AND CONTROLS · TEMPERATURE CONTROLS · CABIN AIR COMPRESSORS · TURBINE MOTORS · GAS TURBINE ENGINES · CABIN PRESSURE CONTROLS · HEAT TRANSFER EQUIPMENT · ELECTRO-MECHANICAL EQUIPMENT · ELECTRONIC COMPUTERS AND CONTROLS

Briefs

(*Continued from page 7*)

who is vice president in charge of operations for the Spencer Chemical Company, succeeds C. G. Roush, another prominent NSPE member, in the safety post.

❁

College Applications Up, Says Carnegie Tech

The demand for higher education in the United States continues to accelerate, while expansion of educational facilities still only creeps along, according to a statement recently issued in the name of the Carnegie Institute of Technology. Applications for the Pittsburgh college this fall, the statement said, were the greatest since the general dip following the rush to college in the immediate post-war period. For the second consecutive year, the number of Tech applicants was 25 per cent above 1953.

Applications for the school's College of Engineering and Science this year numbered 2500, and there were 200 additional transfer applications. In order to maintain established standards with the present faculty and facilities, only 400 freshmen and 72 advanced students could be admitted, the school representative said.

Approximately 90 per cent of the 2500 applicants in Engineering and Science applied for scholarships. A total of 90 engineering and science freshman scholarships valued at $51,000 were granted for the 1955-56 year, with the individual grants ranging from $100 to $1380 but averaging $608 per year. Two years ago the average scholarship worth was $440.

Total undergraduate enrollment in the Tech College of Engineering and Science for the new term was reportd to be approximately 1600, while the number of graduate students was 300.

❁

Noel Tweet Takes South Dakota Post

Noel F. Tweet of Kansas City, Kansas, has been hired as director of the South Dakota Industrial Expansion and Development Commission, according to an announcement made in Pierre, S. D., by Governor Joseph Foss. The ten-man commission which Mr. Tweet will head has been created by the Governor to carry out an accelerated industrial development program in the State.

A member of the Missouri Society of Professional Engineers and NSPE, Tweet has been serving as executive director of the Missouri-Arkansas Basins Flood Control Association with offices in Kansas City, Kansas, having responsibility for the promotion of water and soil conservation projects. Having a long record in industrial development work, he has also been industrial manager of the Kansas City Chamber of Commerce and manager of industrial development and sales for the Missouri Public Service Company in Sedalia, Missouri.

A native of Eau Claire, Wisconsin, Mr. Tweet received his education at St. Olaf College, Northfield, Minnesota, and the University of Wisconsin in Madison, receiving a B.S. in electrical engineering from the latter.

L. M. Paramore of Topeka succeeds Mr. Tweet as executive director of the Mo-Ark Basins Flood Control Association.

❁

Electric Computers Mean Changed World

Electronic computers will change the world as much as did the inventions of the wheel, the steam engine, and even atomic energy, according to a recent speech given by H. R. J. Grosch, manager of the General Electric Company's Aircraft Gas Turbine Division. His address was delivered at the University of Wisconsin during a conference of leading engineers, scientists, and mathematicians who had gathered to discuss research uses of the new "electronic brains."

In fourteen years, Mr. Grosch said, money and manpower expended on computing in his industry alone had increased one thousand times. He stated that the electronic brains made it possible to solve on paper problems that could formerly be solved only by building experimental airplanes.

"Increasing use of applied math and computation, which enables us to conduct our experiments on paper, is not only far cheaper," he said, "but we are able to explore many more possible design types, and be more certain that our final design is best."

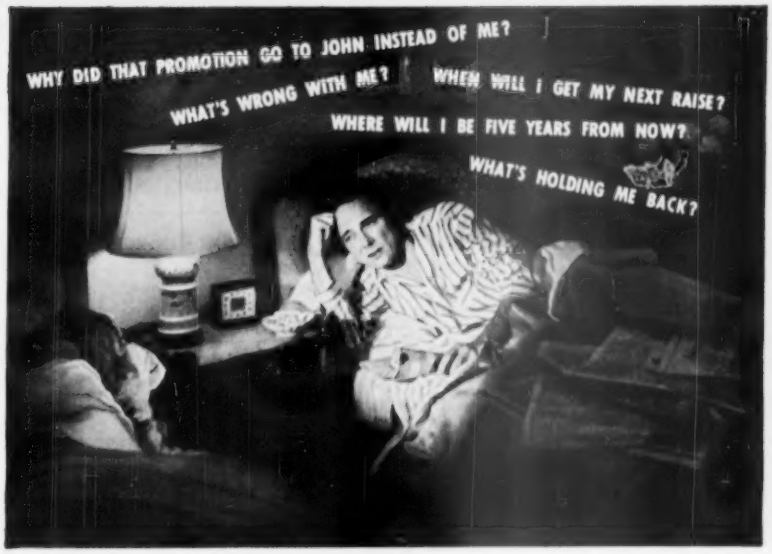
Management Development Studied In Survey

Fifty-four per cent of the companies responding to a recent American Management Association survey indicated that they have some systematic program for the development of personnel for management responsibilities. An additional 21 per cent of the 460 firms surveyed reported the designation of a particular member of the organization to guide or promote management development, although they stated they had no formalized development programs.

The selection of certain departments, groups, or individuals for management education followed no discernible pattern among the participating firms, the AMA study found, as the local or immediate situation inevitably governed the selective process. However, the engineering departments, certain staff engineers, or other technical personnel were among those groups and persons specifically cited by a number of the survey respondents as being among their management training selectees.

Some companies also indicated a reduction in turnover which they attributed directly to management development activities.

The complete results of the study have been published by the American


WHY DID THAT PROMOTION GO TO JOHN INSTEAD OF ME?
WHAT'S WRONG WITH ME?
WHEN WILL I GET MY NEXT RAISE?
WHERE WILL I BE FIVE YEARS FROM NOW?
WHAT'S HOLDING ME BACK?

"Forging Ahead in Business" will help You Answer These Questions About Yourself!

AND EVERY AMBITIOUS MAN MAY HAVE A COPY...*FREE!*

IF you wonder and sometimes worry about your future, you're no different than thousands of other serious-minded men who realize that *success* comes only to those who *plan* for it. The happy-go-lucky person who is content to let the future take care of itself never gets very far. The man who depends on personality and "bluff" soon finds that the big jobs are passing him by.

The one *sure* way to increase your income is to *prepare* yourself for positions of added responsibility. To step up in business today . . . to make a lot more money than you're making now . . . you must be able to match every challenge of success with sound, practical knowledge.

Send For Your Free Copy of *"Forging Ahead in Business"*

What must you know to make $10,000, $15,000, $20,000 or more a year? How can you take advantage of the great opportunities business offers today?

These are among the questions answered for you in "Forging Ahead in Business," one of the most interesting and helpful little books on personal advancement ever written.

Don't misunderstand. We do not claim that "Forging Ahead in Business" holds a magic key to quick and easy success. It reveals nothing that will make corporation presidents out of men who are clerks at heart. But it does give you the benefit of our many long years of experience in dealing with the problems all men face in their efforts to better themselves. And it outlines a program of executive training so complete and so scientific that each day carries subscribers closer to their chosen goal.

There's no charge for "Forging Ahead in Business" because we have never been able to set a price on it that would reflect its true value. Some men toss it aside, unread. Others have found a fortune in its pages! If you feel it is meant for you, simply fill out and return the coupon and your complimentary copy will be mailed promptly.

ALEXANDER HAMILTON INSTITUTE
71 West 23rd St., New York 10, N. Y.

ALEXANDER HAMILTON INSTITUTE
Dept. 372, 71 W. 23rd St., New York 10, N. Y.
In Canada: 57 Bloor St. W., Toronto, Ontario.

Please mail me, without cost, a copy of your 48-page Book—
"FORGING AHEAD IN BUSINESS"

Name .....
Firm Name .....
Business Address .....
Position .....
Home Address .....

Here's Proof...

OPPORTUNITY IS GREATEST AT RCA, FOR EXPERIENCED SCIENTISTS AND ENGINEERS!

#1—Over 500 experienced design and development engineers and scientists chose RCA careers last year . . . plus additional hundreds of recent engineering graduates, field engineers and other categories of experienced engineers.

#2—Today, RCA progress opens many new, desirable positions in:

SYSTEMS ENGINEERING • ELECTRONIC DATA PROCESSING SYSTEMS
GUIDED MISSILE ELECTRONICS • AVIATION ELECTRONICS • ELECTRON TUBE DEVELOPMENT

Check positions in your field of interest . . .

Modern employe benefits . . . Relocation assistance

Please send resume of education and experience to:

Mr. John R. Weid, Employment Manager, Dept. A-19K, Radio Corporation of America, 30 Rockefeller Plaza, New York 20, New York

	FIELDS OF ENGINEERING ACTIVITY	DEGREE REQUIRED: Electrical Engineers	Mechanical Engineers	Physical Science
SYSTEMS	AIRBORNE FIRE CONTROL	W		W
	DIGITAL DATA HANDLING DEVICES	C	C	C
	MISSILE GUIDANCE - INERTIAL NAVIGATION	MF	MF	MF
	COMMUNICATIONS	CFO		CFO
DESIGN + DEVELOPMENT	RECEIVING & MICROWAVE TUBES	H	H	H
	COLOR TV, GAS, POWER & PHOTO TUBES	L	L	L
	AVIATION ELECTRONICS - RADAR	MCF	MCF	MCF
	COMPUTERS	MCF	MCF	MCF
	COMMUNICATIONS	MCF	MCF	MCF
	RADIO SYSTEMS	FO	FO	FO
	MISSILE GUIDANCE	MF	MF	MF
	COMPONENTS (COLOR TV)	C	C	C
	MACHINE DESIGN	LH	LH	LH

Location Code: C—Camden, N.J. F—Florida H—Harrison, N.J. L—Lancaster, Pa. M—Moorestown, N.J. O—Overseas W—Waltham, Mass.

RCA **RADIO CORPORATION OF AMERICA**

Copyright 1955 Radio Corporation of America

Save with **Permanent** Copperweld SURVEY MARKERS

thick copper covering molten welded to steel core

Protect your investment in the original survey—and protect yourself from troublesome disputes.

At Little Cost you can quickly and easily drive Copperweld* Survey Markers and have permanent reference points. Bronze head can be center-punched and stamped for identification. If larger head is needed, a 4" adapter is available.

*Trade Mark

Standard length is 3 feet—other sizes made to order. Packed 10 markers to a carton.

COPPERWELD STEEL COMPANY
WIRE AND CABLE DIVISION Glassport, Pa.

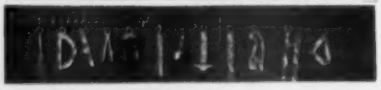
Write for Bulletin 144

FIRE SIGNALING SYSTEMS

● Engineers, Designers, and Manufacturers of Electrical Systems for the Protection of Life and Property from Fire

See advertisements in Pennc. Society Year Book, N. J. P. E., and N. Y. P. E.

ACME FIRE ALARM CO., INC.
C. W. Mitchell, P. E. President
106 Seventh Ave., New York 11, N. Y.



ENGINEERING CHARM BRACELET **$4.98**

Twelve accurate miniatures of the engineering profession each Hamilton Gold Plated and guaranteed perfect! Not sold in stores!! Low price includes tax, postage, and individual gift boxing. Money back guarantee! Send check or money order *now!!*

PERSONALIZED GIFTS CO.
160 Fifth Ave., Dept. 110-E, N. Y. C.

Management Association under the title, *Current Practice in the Development of Management Personnel.*

Copies are available from the AMA at a cost of $1.75 per copy ($1.25 to AMA members). The organization's address is 330 W. 42nd Street, New York 36, N. Y.

❁

Building Research Institute Board Includes NSPE Men

Two well-known members of the National Society of Professional Engineers are among the recently elected members of the Board of Governors of the Building Research Institute. They are John F. Hennessey, president of Syska and Hennessey, Inc., engineers of New York City, and Charles H. Topping, senior architectural and civil consultant with E. I. du Pont de Nemours and Company, Inc., Wilmington, Delaware.

The terms for the new board members run until June 30, 1958. Others elected at the same time were: Charles W. Attwood, president, Unistrut Corporation, Wayne, Michigan; Andrew Place, Place and Company, South Bend, Indiana; Otto L. Nelson, Jr., vice president for housing, New York Life Insurance Company, New York City; and R. K. Mueller, vice president, Plastics Division, Monsanto Chemical Company, Springfield, Massachusetts.

❁

Management Course Scheduled for L.A.

A special short course designed to contribute to the development of engineers and managers and to prepare them for higher management responsibilities has been announced by the University of California Extension in cooperation with the College of Engineering and the School of Business Administration. The Engineering and Management Course will be given at the Los Angeles campus of the University from January 23 to February 2, 1956.

The ten-day program will include general management subjects, traditional industrial engineering topics, and new principles and new techniques such as automation and electronic data processing for business and industry.

Full information and application blanks are available from the coordinator of the course: Edward P. Coleman, College of Engineering, University of California, Los Angeles 24, California.

American Engineer

The Magazine of the Registered Professional Engineer

VOLUME TWENTY-FIVE NUMBER TEN

Here a Man Who Knows Writes About Our Most Serious Shortage . . .

Skill in Depth: the Answer to the Manpower Problem

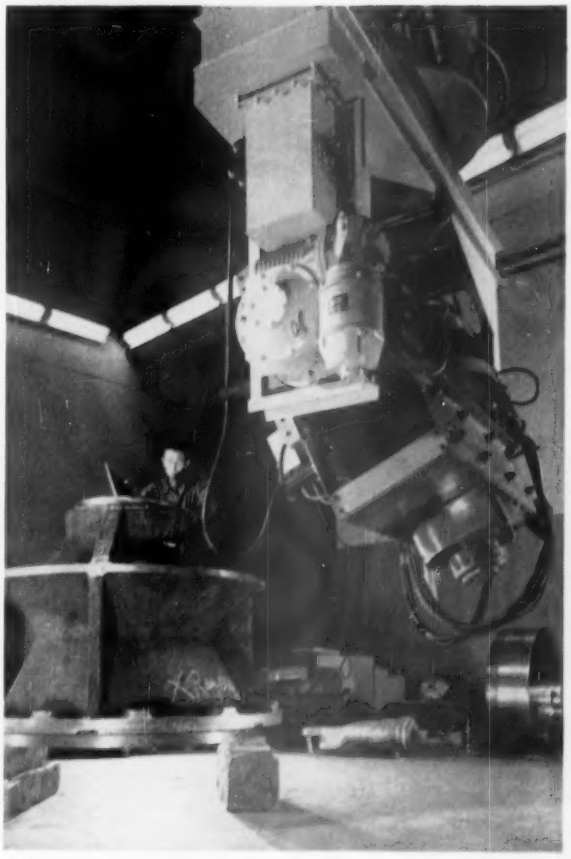
By
JAMES P. MITCHELL,
Secretary of Labor

THE United States is up against a problem today which could sharply curtail our technological development, weaken our domestic prosperity and undermine our position of leadership in the world. I am talking about the immediate need of improving the skills of our work force. Because our economy is based upon a complex and constantly evolving technology, it could not function without an adequate supply of skilled mechanics and technicians. Within the next twenty-five years, the discoveries of modern science will make it necessary for almost every worker to possess a certain amount of skill, based on training and experience.

Moreover, what often appears as a shortage of highly qualified scientists and engineers, is in reality a shortage of skilled mechanics and technicians who can develop the product of the scientist's discovery and the engineer's design. The contributions of science and engineering are indeed breathtaking, but it must be remembered that these contributions are brought to their final realization only through the every day efforts of millions of skilled workers—electronics specialists, radar men, machinists, tool and die makers, draftsmen, and technicians of all sorts.

Today there are but nine million skilled workers in a total civilian force of 64 million. Our manpower is exhaustible, and it is limited. Whether we like it or not, we have a maximum beyond which we cannot go. We cannot create a larger work force by wishing it, but we can create a more highly skilled work force by consciously developing it.

Engineers are currently alert to the need for increasing competence and broadening the scope of scientific capability within their own ranks. Such groups as the Pro-



The author says that what often appears as a shortage of highly qualified scientists and engineers is in reality a shortage of skilled mechanics and technicians. Above a technician in a large Milwaukee plant uses a 22-million volt betatron to check heavy steel castings.

Labor Secretary Mitchell points out that skilled workers acquire qualification in their specialties in a number of ways, formal apprenticeship being one. At right is shown a chipper at work in a General Dynamics Corporation plant.

fessional Engineers Conference Board for Industry are constantly studying, reporting on, and making recommendations for improved utilization, better training, more effective recruitment, and more lasting job tenure among the engineers themselves.

No one, therefore, should be more conscious than they of the need to make the same careful effort to see that their supporting personnel are properly trained and given appropriate opportunity to achieve optimum production in their technical specialties.

For the training of our workers we use many sources—schools and colleges, vocational education, apprenticeship, the Armed Forces and on-the-job training courses of industry. We must re-examine all of these to determine whether the methods they employ and the skills they teach are keeping pace with the temper of our times and the requirements of our economy. We must re-evaluate our training programs to determine whether we are training enough of the people we need in the skills we require.

The need for skills in industry is paralleled by the need for them in our Armed Forces. In a total strength of three million men, we are roughly 30 per cent short of fully qualified skilled personnel for critical military jobs. There is an urgent need, for example, for 35,000 aircraft mechanics and electronics technicians; for 25,000 electronic equipment operators; for 10,000 communications equipment mechanics. For every three skilled persons or technicians that the Armed Forces require, only two are currently available.

Advances in defense mean more and better technicians are needed, more and better skilled workers are needed, both in industry and in the Armed Forces. At the very instant that the prow of the Nautilus first touched the waters of the Atlantic a demand for a new type of skilled worker to build and service atomic ships was immediately created. The men in charge of our defense establishment are deeply concerned about this problem. They have ample cause for that concern.

The shortage of skilled workers in industry is well reflected in the reenlistment records of the United States Army. One per cent of the electronics maintenance personnel are willing to re-enlist. Industry's bid for these trained men is too good for them to resist. The more skill a soldier has, the less likely he is to re-enlist, for his skill is in such high demand elsewhere. By making service with the military more desirable through raising the pay, military shortages may very well be transferred to industry.

THIS is a problem which must be faced by our whole Nation—industry, labor and government. Perhaps one of the most important things to consider first is the need for improvement of basic education in the United States. For without the foundation of good schooling, without the discipline and elementary knowledge that it gives, there is no basis for skill training—or for progress in the more advanced scientific and other professional fields, as engineers well know.

To give some indication of the way in which poor schooling reduces the number of men able to take advanced training in the military, or even in civilian life, here are some startling facts.

Out of the first Army area—New England—the overwhelming majority of the young men who are examined have enough educational and mental equipment to be taken into the Armed Forces. Only something like 7 per cent fail to pass the mental examination. And in the fifth Army area—the Middle West—less than five per cent of the population fail to make the grade. But in the third Army area—the Southeast—as many as one out of four persons cannot pass the simple fourth grade test the Armed Forces gives as an absolute minimal requirement.

The author says that the problem of utilization of the older worker is serious and primary because workers forty-five years of age and older in America are increasing at a far more rapid rate than the population as a whole.

Thus, we have a situation where the third Army area has five times as many people rejected for military service as the fifth Army area, and this is a direct consequence of the accessibility of basic schooling.

The Armed Services divide their personnel into five broad categories based on mental test scores. I and II are good, III is average, IV is below average, and V they do not normally take.

Of the people whom the Armed Services take from various regions of the country, one out of every two from the third Army area falls into group IV or below, which means that they are definitely not material for further training within the Armed Forces.

In contrast, in the first and sixth Army areas—New England and the Far West—only one out of four of those who are finally taken in would not be good material for further training.

There is a very strong relationship between the education level of the population—illustrated by the number of high school graduates in a particular geographical area—and the number of well qualified people it can contribute to the skilled work force of the Nation both in and out of the Armed Services. In the first Army area, more than one out of every two boys graduates from high school; and 40 per cent of those who enter the Armed Forces are in the upper groups and definitely trainable. In the third Army area, where only 30 per cent of the young men of military age are high school graduates, only 16 per cent of those entering the Armed Forces manage to qualify for the first or second group.

THESE proportions hold up throughout the country. Wherever you have more high school graduates, you have the highest amount of good, qualified manpower. In the Far West, for example, two out of every three are high school graduates, and about 43 per cent qualify for the upper groups.

So the program must start here. We must have better schools in our less fortunate areas, to provide the basic education necessary as a foundation for skill training. The students need strong grounding in the old-fashioned 3 R's. They need to be trained in comprehension. And they need math, whether or not they think they will want to advance into careers to which math is basic. Many technical specialties, short of engineering and science themselves, demand a certain proficiency in mathematics, and it is a tragedy to think that a considerable number of young people turn aside from such careers because they lack the desired fundamentals.

Skilled workers acquire qualification in their specialties in a number of different ways. One of the traditional methods is through a formal apprenticeship under which the worker takes a carefully developed course of training with an employer, involving both practical paid experience on the job and classroom training in the technical knowledge required for the trade.

The Department of Labor promotes and encourages apprenticeship in cooperation with state agencies, employers, and unions. While apprenticeship programs have expanded in recent years, the output of journeymen from programs registered with State Apprenticeship Councils or the U. S. Department of Labor's Bureau of Apprenticeship amounts to only approximately 30,000 to 40,000 a year. Perhaps an equal number are trained through programs not so registered.

Most workers acquire skill status by means other than apprenticeship. In addition to informal training given by foremen or supervisors, many plants have formal training programs of varying duration to prepare workers for specific jobs within their own operations.

Employers must devote more time to the problem of raising the skills of their workers. Engineers know the value of good training programs and should stress them for skilled workers as well as for members of their own profession.

Another common way in which people acquire skill is by informal, on-the-job training. Typical of this process is the worker who gets a job requiring no previous experience, learns by watching other workers in his own occupation or in other occupations in the plant, changes jobs by promotion or transfer to another employer, and gradually broadens his experience until—over a period of years—he acquires the elements of a well-rounded skill. This method of acquiring skill requires a great deal of initiative and ability. The man who acquires his skill in this way is an admirable man, but he is doing it the hard way and the long way.

In recent years technical institutions and junior colleges have been established and have expanded their programs to provide training beyond high school for a wide variety of technical occupations, such as draftsmen and electronic technicians. They have emphasized the relatively newer technical occupations.

All of these methods have appropriate roles and will continue to contribute to our skill resources. In its "skills of the work force" programs for which Congress has recently appropriated $10,000 the Labor Department's goal will be to encourage the expansion of all these avenues of skill development.

The Department will continue to promote apprentice training in situations where this is the most appropriate method of training. We will also do all we can to encourage industry to develop and improve other organized training programs. This is especially important, because such a large proportion of our skilled workers currently receive only informal training on the job.

Industry should start right now and develop such programs on its own. The time has come when employers must devote as much time to the problem of raising the

Secretary of Labor James P. Mitchell holds a press conference in Washington.

skills of their workers as they do to the purchase of new machines and the development of new processes of production. The major responsibility for the development of the Nation's skilled and technical manpower rests with industry, although the cooperation of labor unions and the encouragement and assistance of Government can contribute much.

Engineers are well aware of the value of company training programs to their own professional and technical progress. Such recent reports as the Professional Engineers Conference Board for Industry's executive research on *How to Train Engineers in Industry* delineate the importance ascribed to these programs by management and by industry's professional personnel. They should, therefore, be among the first to appreciate, and indeed among the first to point out, the potential in similar programs for the skilled employees who will support their efforts whether in the research laboratory or on the production line.

One of the first things that employers can begin to do is gather information about their own particular work forces. How many people are they going to have to train in the future to meet the needs of an advancing technology? How many engineers and scientists will they need? How many skilled technical people will be necessary to support their work? What is the age composition of their staffs? What is the loss rate in particular plants due to death and retirement? Once such facts are obtained they can be used as a basis for long-range training programs.

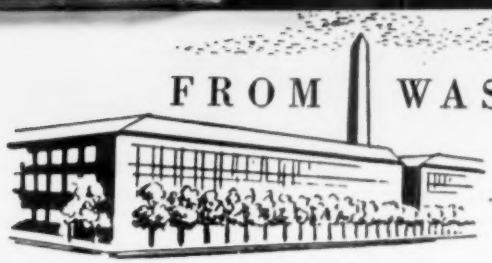
BEFORE the training program is put into effect, several other facts have to be obtained. First, an evaluation of the jobs available in a given plant must be made. What jobs require highly skilled workers? What jobs require semi-skilled workers? Where would be the best place for a new employee to start his career? How long will it take him to work his way up to a skilled job? Often, studies of this nature reveal that many highly skilled workers are being wasted on jobs which less skilled men and women could do. A broad training program based on the age composition of the work force, an evaluation of the jobs available, and a step-by-step method of promotion, can help do away with this waste of valuable skilled manpower.

Secondly, in order to ensure the quality of "in-plant" training, special attention should be given to plant supervisors and foremen. Are these men equipped to train beginners? It might be necessary to institute a special training course for supervisors. Such a course not only would involve the technical aspects of the job, but also supervisory relations and techniques, and conference leadership. By these means, supervisors grow to understand how to get the most from the people working under them, how to organize, and how to apply the most efficient methods for getting the work done. Conference leadership training is a management tool of great value in drawing out and developing supervisors for further management responsibility.

Our skilled resources can be expanded in quantity and quality if we can encourage every potential new worker to seek training opportunities that will fully exploit his abilities and if the number of persons preparing for particular fields of work matches as closely as possible the needs of employers and the national security. One direct way of accomplishing this is to provide effective and realistic vocational guidance services to the Nation's youth. Young persons typically have little specific knowledge about many important occupational fields with which they do not have frequent contact in their daily life or which have not been glamourized in the popular press. Qualified guidance counsellors, armed with authentic information on the nature of the work, the training requirements, the earnings, and the employment opportunities in the wide range of occupational specialties which comprise our work force, can fill this gap and help youngsters become oriented to the world of work. Through testing of aptitudes and other qualities, youngsters can become acquainted with their own abilities and interests, and be helped in choosing career fields related to them.

In its recent far-reaching and significant report, *A Policy for Skilled Manpower*, the National Manpower Council recommended that "State and local Governments and Boards of Education recognize that the provision of essential educational and vocational guidance services is a major responsibility of secondary education by increasing substantially and rapidly the funds and staff available for guidance and counselling purposes." The U. S. De-

(*Continued on page 44*)



FROM WASHINGTON

By
Milton F. Lunch,
N.S.P.E.'s Legislative Analyst

THE ROLE OF GOVERNMENT IN ENGINEERING SUPPLY

The stage is now being set for high-level Governmental decision on several aspects of the continuing cry for the training of more engineers and scientists. Hardly a week now goes by that some ranking Federal official does not refer to the emphasis Russia is putting on the training of great numbers of engineers and scientists, comparisons of Russia's technical manpower output compared to the United States, and the growing dependence of national defense on an adequate force of engineers and scientists.

The list of those Governmental figures who have spoken in this vein reads like a "Who's Who in Government." Among the more recent voices in this direction are Dr. Alan T. Waterman, Director of the National Science Foundation; Donald A. Quarles, Secretary of the Air Force; Admiral Arthur Radford, Chairman of the Joint Chiefs of Staff; and Lewis L. Strauss, Chairman of the Atomic Energy Commission. The list of eminent names could be multiplied many times.

But very few of those speaking on the question have attempted to say what the Government can or should do about it. Some suggestions may come out of the White House Conference on Education, to be held in Washington, November 28 to December 1. One section of the Conference, called "What Should Our Schools Accomplish?" is headed by Dr. James R. Killian, Jr., president, Massachusetts Institute of Technology. This group is expected to consider the problem of increasing the quantity and quality of mathematics and science teaching in the elementary and high schools. The impressive nationwide collection of editorials and articles on this subject, compiled by NSPE as a result of President Neff's letter to publishers calling attention to present deficiences in this field will be made available to the Conference.

The world's largest "thermos" bottle is this huge steel sphere for testing atomic submarine engines. It was insulated with more than 138,000 square feet of cellular glass insulation blocks to minimize escape of fissionable material. Officials say more engineers are needed for such government projects.

Dr. Killian also heads a scientific study group which is unofficially said to have turned in a report to President Eisenhower and his advisers on the scientific race between the United States and Russia for weapons superiority from a long-range viewpoint. According to unconfirmed reports, the Killian Committee's top-secret report is under study by the National Security Council. It is said to deal primarily with "methods of mobilizing the Nation's scientific resources for use in the event of an emergency." The same reports also state that it deals somewhat extensively with the matter of turning out more scientists and engineers in the United States.

(Please turn the page)

(Continued from previous page)

Admiral Strauss appeared recently on the Columbia Broadcasting System's TV program, "Face The Nation," and after stating, ". . . I believe that we are somewhat behind in the pressure that we are putting on our educational program," he was asked the direct question:

"What should we do?"

He answered: ". . . I hate to labor the point, but we are not turning out the numbers of engineers, of technicians and of scientists required by the size of the program that we envisage." To the question, "Would you favor Federal scholarships of any sort in science and engineering?" the AEC Chairman replied:

"It is not a lack of scholarships; there are scholarships today which are going begging. I suspect that the trouble is back in the secondary schools, or perhaps even before that."

In this view Admiral Strauss parts company with a number of others who have spoken on the question. An impressive number of Members of Congress have introduced bills to establish and finance Federal engineering and science scholarships. Governor Averell Harriman of New York, speaking before the New York State Committee of the White House Conference on Education, declared: "There are, of course, many private scholarships available, and more are being provided. But in the main, who goes to college in America is still determined more by wealth and family income than by ability." The recent announcement of a multi-million dollar scholarship program to finance the college education of the Nation's most talented high school seniors will probably be cited in the forthcoming discussion as evidence that private funds are sufficient, and that Federal money is not needed. The new private organization, National Merit Scholarship Corporation, financed largely by the Ford Foundation, expects to attract considerable additional funds from private industry, and to award up to 5,000 scholarships a year within five years.

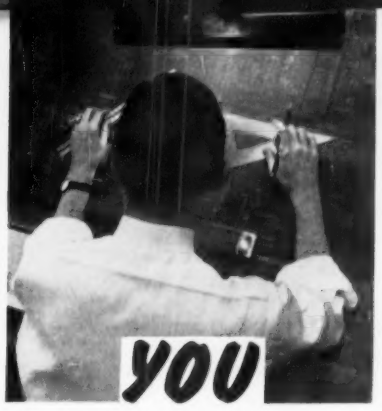
In his "Face The Nation" appearance, Admiral Strauss touched on a point which has been completely neglected by other Federal spokesmen—salaries. He was asked what pressure can actually be exerted if people choose not to become teachers at salaries which are too low and choose not to pursue a course of science or engineering. The AEC chief replied, "Well, something might be done, perhaps, about salaries." When pressed on this intriguing point, Admiral Strauss further observed: "It isn't solely a matter of raising salaries, because, of course, in Russia it isn't a question of salaries. They get all sorts of fringe benefits. They get better homes, better transportation, and better standards of living, generally. That is represented to some extent in our civilization by salaries, but there are probably other ways of doing it." Later he added to his suggestion that part of the answer might lie in raising salaries: "I think that is the kind of approach that, as a businessman, first occurs to me as one way to correct the situation."

Admiral Strauss

These off-the-cuff observations by Admiral Strauss raise more questions, of course, than they answer. Was he indicating that the Federal Government should supplement the salaries of engineers and scientists in private employment? (Probably not.) Or that Federal money should be supplied to local community school boards to aid them in securing math and science teachers? Or that the Government should encourage private employers to increase salaries to make engineering and science careers more attractive? Or were his observations merely of a general and indefinite character?

Admiral Strauss revealed that he had discussed the engineering and scientific manpower supply situation with President Eisenhower at Denver, following his return from the Atoms-for-Peace Conference at Geneva. He said that he had made no recommendations to the President, but he is to engage in conferences on the subject with other interested agencies of the Government. He said that he is to meet with the Commissioner of Education, officials of the National Academy of Science, the Director of the National Science Foundation, and others. Out of these conferences, the National Security Council consideration of the Killian report, the White House Conference on Education, and other confabs may well emerge some very significant and far-reaching recommendations for Federal action, of some sort.

Regardless of where one stands on the controversial "shortage" question, this much is clear—a large body of influential officials are sincerely convinced that satisfactory progress in National Defense depends in large part upon an increased flow of engineers and scientists, and they mean to explore every possible avenue of corrective action, including action by the Federal Government, if necessary.



- First of Three Parts -

So YOU Want to Open a Consulting Office . . .

A Word About This Series . . .

To answer many requests, we begin in this issue a three-part series entitled, "So You Want to Open a Consulting Office . . .," featuring the advice of John B. McGaughy, Alfred J. Ryan, and Francis S. Friel, all leaders in the consulting field. Mr. McGaughy's article below begins the series with Mr. Ryan to follow next month with straight-from-the-shoulder remarks on how to actually make your office a successful one. Don't miss a one of the three installments.

—The Editors

By Way of Qualifications—

BY JOHN B. McGAUGHY, P.E.

Lublin, McGaughy and Associates, Architects and Consulting Engineers

THE prerequisites for a successful consulting engineering career vary greatly due to the different circumstances encountered in each case. On the other hand, the backgrounds of successful consulting engineers contain items that are common to all men in this group.

I believe that before any engineer enters this field he should determine if he has the following minimum qualifications:

1. An adequate education.
2. A valid engineering registration in the state in which he proposes to practice.
3. A firm belief in his own professional ability.
4. Broad experience in "responsible charge of engineering work" on projects of the type and magnitude of those he hopes to be able to obtain from clients.
5. Business acumen.
6. The necessary means to finance the undertaking for a minimum period of six months.
7. The ability to get along with clients and employees.

I mentioned above that a consulting engineering career required an "adequate education," the word "engineering" being purposely omitted since I feel a purely technical engineering training is insufficient. The consultant should have a professional type of education; *i.e.*, a full, well-rounded education including in addition to the technical training, history, English composition and literature, public speaking, etc. I have always felt that many of our technical schools do the engineering profession a great injustice in the way they regulate the engineering undergraduates' activities. In many of these colleges, engineering students attend their classes together, room together, study together and live in a little, narrow engineering world all their own.

I believe that most educators agree that engineers would benefit from a liberal education. The problem is how to insert "humanities" in an already overcrowded curriculum. Perhaps engineering courses will have to be lengthened to five or more years; however, until this has been accomplished it will be impossible to liberalize the already overcrowded engineering curriculums. It is necessary, therefore, to accomplish the objective of broadening the outlook of the engineering student by other means. I believe that this can be done by placing engineering students in daily social contact with law, business, liberal arts, and medical students.

THE engineering undergraduate who is forced by circumstances to express his thoughts daily to non-engineering students soon realizes that the lines of communication he uses with engineering students cannot be used satisfactorily with the rest of the student body. Unfortunately many of our best technically trained engineers never have

discovered that they have no satisfactory line of communication when they try to deal with the non-engineering public.

As I look back, I realize that I was indeed fortunate to have roomed with non-engineering students throughout my college career. At my fraternity house in which I lived at the university, I was the only engineering student. The bull sessions we held on politics, religion, literature, law, medicine, sports, etc., were broadening and educational, although at times when I received my grades it was hard to realize.

Before you can legally offer your services to the general public, it is necessary to obtain a license from the state in which you plan to practice. Always remember that the state registration laws which regulate the practice of engineering are for the protection of the general public, not the engineer. The state registration boards act as a legal yardstick to determine if it is in the interest of the public to permit an applicant to become legally qualified to practice engineering. Each state board sets up and administers its own examination of the applicant. Most states grant reciprocity provided the applicant was originally registered by a written examination. It is advantageous, therefore, to receive your license by written examination unless you plan to limit your practice to only one state. The consultant who plans to operate in a number of states should become registered with the National Board of Engineering Registration as this registration will aid and expedite registration in practically all states.

Before opening a consulting engineering office, it would be very nice to be assured of a sufficient number of clients. This approach, however, is not practical since I believe you are morally obligated to be completely loyal to your employer while receiving employment in a professional capacity. It is, therefore, very questionable if you could work in the best interest of your employer while lining up clients for yourself. Consequently, it is necessary to give up the relative security of a salaried position to enter private practice in which your earnings, if any, are an unknown factor. This step requires not only confidence in yourself, but the enthusiastic support of your wife.

When I decided to start my practice, about the only assets I had were a B.S. in Civil Engineering from Duke University; engineering registration in Virginia, North Carolina, and with the National Board of Engineering Registration; a firm belief in my professional ability, and a little cash.

I DON'T know exactly what I expected when I opened my office; however, it was a rather rude shock to me to find out that not too many people had any need for a consulting engineer's service. I soon discovered that clients don't engage engineering services by utilizing the telephone classified directory. In my case, it was about four months before I was able to negotiate a contract of sufficient size to meet current expenses. As I have since learned, this client selected me due to the recommendation of a mutual friend, an architect, who is now my partner.

You Must Have . . .

An adequate education.

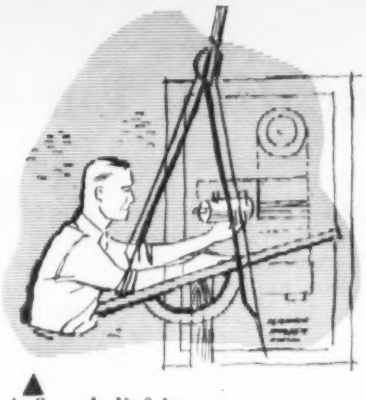
One of the major problems the new consultant faces is developing an impressive list of projects designed by his new firm. Each client generally wants to know when and for whom you handled a similar project equal to or larger in scope than the one he contemplates. That fact that you were in "responsible charge" of similar projects while employed by others is helpful, but usually this is not sufficient. The better your experience and background, however, the better chance you have to convince the prospective client to engage your services. Getting the first project of this type in the name of the new consultant is extremely difficult, time consuming and discouraging. Just remember that most all consultants have had to face the same problem.

Many consultants have tried to overcome this problem by associating with older, well-known firms in order to secure a project. My experience is that this is generally unsatisfactory, for unless the reputation of the new consultant is well known, the older firm will not enter into such an arrangement. My advice is that unless you can make a real contribution to the joint venture, don't become involved in it, since it might hurt your professional reputation.

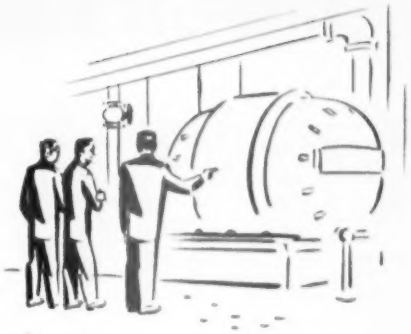
When a business man requires the services of a consulting engineer, he studies the background of the firms under consideration and selects the firm he considers the most qualified for the project based upon a record of proven experience. This procedure makes it extremely difficult for the new firm to obtain clients. In an attempt

Below, left. A staff conference in the Norfolk, Va., office of Lublin, McGaughy and Associates. From l. to r. are William Marshall, J. A. Rives, A. J. Chewning, the author, and W. T. McMillen. In the photo on the right is shown the drafting room in the Washington, D. C., office. Offices are also maintained in Paris, France.

Registration in state of practice.



A firm belief in your own professional ability.

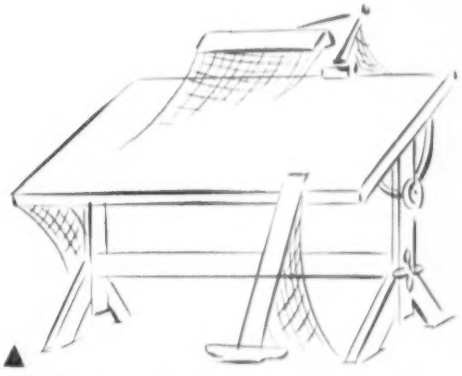


Broad experience in your specialty.

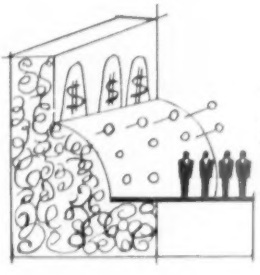
to overcome this obstacle, the new firm frequently resorts to the undesirable practice of cutting fees. This procedure usually fails to accomplish the desired results since the client concludes that the only reason an engineer would drastically reduce his fee is because he feels that his services are inferior. The method I employed to help overcome this handicap was to impress upon the client the advantages of the small firm in which his project would be under the full-time supervision of a principal instead of under the supervision of a salaried employee of the large firm.

Consulting engineering, in addition to being a profession, is also a business that has to comply with all local, state and Federal laws relative to taxes, employees' rights and benefits, accounting procedure, etc. The engineer also has need for numerous project cost records, etc., so that he can determine if his practice is being run efficiently and profitably.

One of the chronic complaints among engineers is that the layman is forever trying to do engineering planning which, as we all know, is being "penny wise and pound foolish." It is astonishing how many engineers try to save a little money by depriving themselves of the professional services of lawyers, certified public accountants, bankers, insurance experts, etc. Our firm has found that these professional advisors save us time, trouble and expense and actually increase the earnings of our firm by permitting the partners to spend more time supervising the engineering staff.

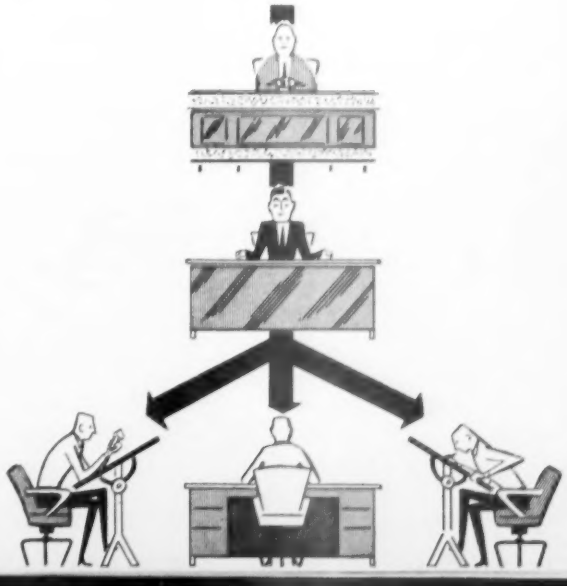


Business acumen to assure financial success.



Financing for at least six months.

The ability to get along with clients and employees.



In starting a consulting engineering practice, the engineer must be able to carry the financial burden of operating an office for a minimum period of at least six months. Even if you are fortunate enough to obtain a valuable engineering contract, there is usually a considerable delay between the time the work is completed and payment is received. Always remember the larger the fee, the heavier the financial burden. Under such circumstances, you will find that the services of your banker are indispensable. Do not wait until the last minute before seeking his advice but try to anticipate your financial needs so that he has a chance to work out a solution for you.

The consultant must be able to get along with his employees, otherwise, he will be unable to keep top grade engineers in the key positions in his organization. Without these employees, the consultant's engineering work will not be of a high calibre, and he soon will lose his

(Continued on page 46)

Officials Comment on Emerson Piece

► In the August issue, the *American Engineer* published an article entitled "National Defense Begins in the College," by Cherry L. Emerson, former Vice President and Dean of Engineering of Georgia Tech. In the piece Mr. Emerson treats the financial plight in which our technical schools find themselves, their shortage of teachers, and other problems. The AE asked several leading officials to comment upon the article and letters in answer from Secretary of the Air Force Donald A. Quarles and Secretary of the Navy C. S. Thomas are printed below. Mr. Quarles' comments were written while he still held the position of Assistant Secretary of Defense.—*Editor.*

Dear Editor:

Thank you for sending me a copy of the August issue of the AMERICAN ENGINEER. I have read with interest the article by Mr. Cherry L. Emerson. . .

I do not feel that there is any argument with the broad objectives outlined by Mr. Emerson or with his thesis of providing support to scientific education. I cannot agree, however, with the method by which he proposes to accomplish this.

Air Force Secretary Donald A. Quarles

Funds appropriated to the Department of Defense for research, which can be utilized in educational institutions are limited. The purpose for which these funds are appropriated is to obtain the maximum research for the national defense. We do not feel that the defense appropriation is the place to subsidize education even though a subsidy may be desirable.

We have heard no comments from the universities that would indicate that the method used by the Department of Defense to determine overhead rates resulted in rates less than the total cost of performing the research. However, the National Science Foundation is studying the impact of the Federal Government research programs on educational institutions and the question of desirability of a Government policy for reimbursement of indirect cost which would be applicable to all agencies.

Sincerely yours,

DONALD A. QUARLES

Dear Editor:

Thank you for your letter of 11 August calling my attention to the feature article. . .

The Navy has long recognized the importance of research to its own developments, and further, one of the basic philosophies of the Navy is to stimulate scientific interest in Naval problems and promote research which is of Naval interest in order that we may utilize the best technical and scientific information available. Through this interaction with the academic, scientific community, both the university and the Navy benefit. We support extensive research and the training of technical and scientific personnel, both within our own laboratories and through the program of contract research with educational institutions. Since they are traditionally in the foreground of knowledge and new scientific ideas, our future technical strength in both scientific manpower and knowledge resides in the universities and the military departments must maintain close alliance with them.

The Office of Naval Research, which conducts and coordinates university contract research for the Navy has approximately 2500 such contracts with 180 colleges and universities. Most of these contracts will contribute to the store of fundamental knowledge and provide opportunities for training young scientists. Thus, in spite of the specific limitations upon the Services in the spending of their research dollars, many indirect benefits accrue.

For example, a member of the faculty of Mr. Emerson's Georgia Institute of Technology has stated that a Navy research contract indirectly contributed to the inauguration of its Ph.D. program. Several discoveries of first-rank were announced at a conference in low temperature physics sponsored by the Navy and held at Georgia Institute of Technology. This conference brought some of America's leading scientists to the campus.

To take an example from another university, one project in the field of jet propulsion has provided approximately 380 student-years of graduate employment training, which has resulted in 92 graduate degrees awarded thus far. These are not isolated instances illustrating the importance of our service programs to the build-up of basic science. Numerous similar examples could be quoted. They reflect an optimistic side of the grave situation explored by Mr. Emerson.

It would take many volumes to analyze all of the problems raised by Cherry L. Emerson in his article. For example, the American Council on Education recently published a 93-page report of its Committee on Institutional Research Policy entitled "Sponsored Research Policy of Colleges and Universities." The latter study is concerned largely with fiscal policy related to sponsored research, one of Mr. Emerson's chief worries.

Navy Secretary C. S. Thomas

Mr. Emerson implies that indirect costs are arbitrarily decided. He asks:

> **"Why not, in the name of common sense, pay an indirect rate of 200 per cent or 300 per cent on research contracts? This would pump a little tax money into those institutions that can return an output of trained men as well as the answers to the problems submitted to them."**

Federal funds appropriated for military research must be used for this purpose alone and not for purposes of subsidy. The Navy recognizes the problem of indirect costs, and equitable percentages are paid by the Office or Bureau sponsoring a research project. These are based on the interest of the institution in the project and on the institution's ability to contribute. In most cases the full indirect costs are assumed. For the purpose of determining the cost of research, it is the policy of the Navy to include both overhead and direct expenses as a part of the total cost. The method of computing these costs is defined by Section XV of the Armed Services Procurement Regulations. The basis for a Naval research contract must be Naval interest, and cost sharing must be measured by the nature of the work and its value to the Navy program as well as its value to the university.

Sincerely yours,

C. S. THOMAS

"In Union There Is Strength"

Let's Take Warning from History

BY ALLISON C. NEFF, P.E.
President, National Society of Professional Engineers

THE statement "In union there is strength" is not merely an effective and inspiring patriotic motto. It is also a basic truth applicable to many situations other than the emergence and the lasting solidarity of a nation. It is particularly applicable to the case of a profession whose members want to carry their legitimate weight in society so that their opinions, objectives, and ideals become known and respected by the general public.

Unfortunately, however, one of the plagues of the engineering profession has been the tendency to splinter—to form small, special-interest organizations, often directed to only one very limited technical or professional consideration, instead of working out the concerns of the small groups within the broad and flexible framework of the larger, long-established societies. While such splintering may indeed serve a particular interest or solve a specific problem of the individual group at the time, in the long run it cannot help but create more problems for the profession as a whole.

The engineering profession has been aware of the dangers of this fragmentation in the past. But sometimes the lessons of the past are forgotten, and the enthusiasm for a certain cause propels a number of its adherents toward the hasty organization of a new society which, though of circumscribed scope, tends to draw off a considerable percentage of the membership of the more universal organizations and thereby ultimately weakens the power and prestige which could come from a unified profession.

Five years ago, when I was serving as a national director from Ohio, I wrote an article on this problem which appeared in the AMERICAN ENGINEER under the same title as that which I have used for this piece. I was concerned then because of an upsurge of splintering being evidenced within the organizations of the profession. I have become concerned again because of the recent formation of a number of new independent engineering groups and the indication that still others may be established in the near future. So I think it is time for us to take another critical look at the situation to see what it bodes and how the challenge that it offers can be met.

As we all know, the military engineer was the first to be recognized in the annals of history. Then, as our nomadic, fighting ancestors conquered choice areas, they lost the urge to wander and settled instead in definite communities where permanent shelters, bridges, water supply systems, and roads were needed. To design and build these, the new profession of the civil engineer came to be recognized. For many centuries thereafter these two branches—the civil and the military—provided for all the engineering needs of the people.

It was, of course, the Industrial Revolution that brought increased specialization and, one might say, "departmentalization" into the engineering field. One man could not be expected to have more than a cursory knowledge of the hundreds and thousands of new developments; he had to stay within one field of engineering in order to work effectively and productively. Soon, therefore, the five major branches were recognized, and ultimately the corresponding societies emerged to represent them.

The even more prodigious developments in the sciences in the past several decades have been paralleled by the establishment of engineering society after engineering society as many of the highly specialized technical men came to feel that their callings were not receiving sufficient effective attention in the programming of the older organizations.

The National Society of Professional Engineers, established to promote the common professional, social, and economic interests of engineers of all branches and specialties, has always believed in the importance of the technical society with its essential objective of keeping its members informed of the very latest technological developments. On the other hand, NSPE believes the professional development of engineers is the responsibility of all engineers working effectively together. Therefore, we should be concerned about the future of the professional society—the future of NSPE.

SOME of the newer engineering groups that are being formed have as their objectives the professional advancement of a particular segment of engineering. Thus they are dealing with problems of a professional character—salaries and fees, ethics, public recognition, and the like. It is good that the interest in professional matters is so widespread, but it will be extremely unfortunate if it becomes so compartmentalized and localized within small groups that it loses the strength and force of a universal movement. Further division will not accomplish the pur-

NSPE believes the professional development of engineers is the responsibility of all engineers working together.

poses to which all of us are dedicated; a profession that is so divided will lose strength rather than gain it. Organization into too many diverse segments can indeed produce the effect of no organization at all.

I believe that we must pick up the challenge that such continuing fragmentation within the profession presents and offer a positive and concrete solution. Furthermore, I believe that this solution must be one that grows from within the Society, that finds its affirmative basis at the state and chapter level. This is made requisite by the fact that splintering in the profession more often than not begins with a group from a limited geographic area and then spreads until a larger "splinter" is pulled away from the national association, though the effect of weakening the over-all professional position is the same no matter how the break-away is begun.

On the one hand, there is no denying that only a portion of the total NSPE membership—or of the total membership of a state society or chapter—will have a direct and immediate interest in many individual professional questions. Competitive bidding, for instance, is of concern chiefly to engineers with consulting practices; the establishment of a separate Civil Service classification system for engineers and scientists in Federal employ is a proposal of direct interest only to engineers in the Federal employment or contemplating Government employment. Also, it is only natural for engineers with a special common professional, ethical, or economic problem to want to get together to discuss that problem without the presence—and quite possibly the "interference"—of those who have only a vague appreciation of its importance.

On the other hand, all levels of a profession and of a professional society should be alert to problems that affect their fellows and should be ready to lend the weight of their support to appropriate action to alleviate them. And it should not be forgotten that at some future date such action may ultimately turn out to be of direct assistance to the individual who was only superficially interested in it a year or so previously. A change of jobs, or even a change of geographic location, may often bring a surprising shift in the range of a man's immediate professional concerns.

From my own personal experience in the Ohio Society of Professional Engineers, I believe that we have found one solution to the problem of professional splintering with the establishment of our "Functional Groups." These groups correspond to the professional interests of various segments of our membership—engineers in industry, municipal engineers, highway engineers, engineers in private practice, public utilities engineers, county engineers, and so on. Each section has a chairman, vice chairman, secretary, and treasurer. A formal meeting is provided for each during the Society's annual meeting. Other meetings may be called at the discretion of the chairman.

THE important thing is that these groups provide a rallying point within the framework of the larger Society for each set of limited, specialized professional concerns. They can be as active and effective as their members care to make them.

Chairmen of the Functional Groups are members of the Ohio Board of Trustees. After the members of a Functional Group settle on a program of action, they present the matter to the Board of Trustees of the Society. If the Board acts favorably, the resources of the entire Society are brought to the support of the program.

With the powerful support of the whole Society, the members of the Functional Group are much more likely to attain their ends than if they formed small independent organizations and tried to "go it alone." This is particularly true when dealing with legislatures.

Further samples of this same sort of constructive stratification are available within the NSPE family, as, for instance, the New Jersey Society's Land Surveyor's Section.

It would be well, I think, for other NSPE state societies to give serious consideration to the Functional Group plan as a means of better serving their members. Some chapters, particularly those with very extensive membership in the larger cities, might find the idea most worthwhile.

To inaugurate the plan, a poll of the membership could be taken and votes tallied on the Functional Groups desired. Only two or three groups, those polling the greatest evidence of interest, might be set up to start with. Perhaps for one society, two or three such sections would be enough; for another, the needs of the membership might eventually dictate the establishment of more.

In every case, however, the important point would be that the men of kindred interests would have a forum for the discussion of mutual problems and the exchange of ideas without having had to separate themselves from the parent society. Moreover, because they are operating within the framework of a unified society they will have the opportunity to see how their thinking ties in with the thinking of other groups having parallel interests in specific problems. (For example, both private consultants and engineers in industry are deeply interested in wage-hour and collective bargaining problems.) And they may well want to combine their discussions in certain instances—something that is easy to arrange within *one* over-all organization but very difficult to accomplish with many *separate* and independent societies. When definite decisions are reached within the group, the resources and support of the parent society can be made available to promote any legitimate plan of action. And, of course, through the mechanism of our three-level NSPE organization, the National Society itself could give support and assistance wherever appropriate.

AS we all realize, of course, right at this moment NSPE stands behind various programs that are of primary importance to certain segments of the membership while holding a lesser degree of immediate concern for others. Thus the Society cooperates in the research programs of the Professional Engineers Conference Board for Industry, urges independent Civil Service classification for engineers in the Federal Government, takes an interest in state highway legislation, supports legislation to permit self-employed professionals to put aside a certain portion of their yearly income on a tax-free basis for a retirement fund, and has most recently, through the medium of the president's office, scored an item in a proposed bill that would permit the TVA to offer engineering services to non-TVA groups.

With functional sections actively organized throughout the state societies, spotlighting other issues of concern, such activities of the National Society can be further stepped up as the eyes of all members are directed to situations within the profession and within the Society with which they perhaps are not overly conversant from a personal standpoint.

To draw an analogy from the international scene—we have seen the confusion in France because of a multitude of small, ineffectual political splinter parties. We have seen many decades of splintering in American engineering societies.

It is time for farsighted men to seek all means to create a centripetal force that will strengthen and unify our existing organizations.

Let's take warning from history!—***End.***

Wage-Hour Appeal to High Court; NSPE to Participate

The decision of the United States Court of Appeals for the Eighth Circuit that the professional services of a consulting engineer are subject to the Federal Wage-Hour Law (AE, Aug. 1955) has been appealed to the United States Supreme Court.

This is the first time that the direct issue has been presented to the Supreme Court. Because of the importance of the case to the entire profession, and because it particularly affects all consulting engineers, NSPE has intervened in the Supreme Court proceeding as a "friend of the court." The NSPE intervention is directed at the basic point that engineering is a profession and not a business and therefore should not be deemed within the Federal laws directed primarily at regulation of business and commercial enterprises.

The appeal was filed by Kenneth R. Brown, a consulting engineer of Des Moines, Iowa, following the Circuit Court's reversal of a District Court decision. The District Court had held that what the consulting engineer did was too tenuous to bring his professional services into the realm of the type of "interstate commerce" activities which are controlled by the law. This reasoning was in line with a 1949 District Court decision in Maryland which also refused the Department of Labor's claim that the functions of a consulting engineer are subject to the labor statute. The Circuit Court, however, held that certain designs by Brown were for projects which would ultimately be used for "interstate commerce" purposes and laid stress on the fact that Brown had supplied a "resident engineer" in connection with the execution of the projects for which he had drawn the plans.

In holding that Brown's services were within "interstate commerce," the Circuit Court cited the drawing of plans and specifications for paving streets in four Iowa towns, enlarging a local power plant, additional equipment for an Iowa municipal power plant and a new headquarters build-

(*Continued on page 50*)

E. W. Seeger . . .

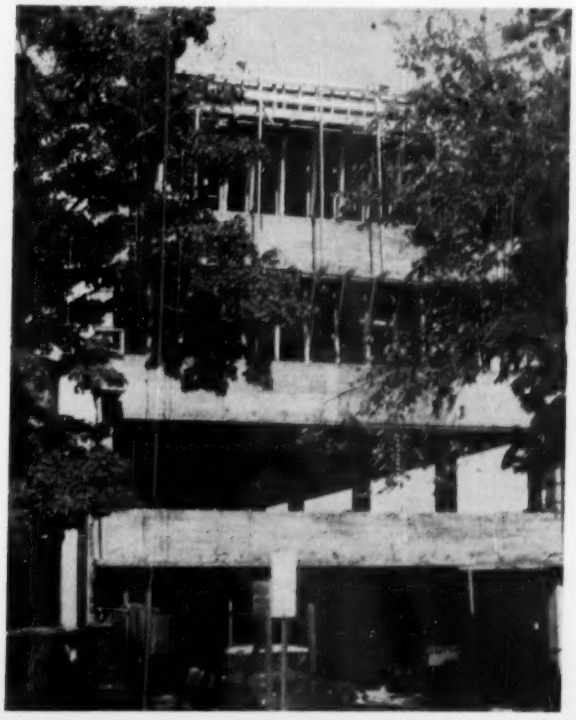
Edwin W. Seeger, pictured above, a vice president of NSPE in 1953-54, died unexpectedly of a heart attack at his home in Wauwatosa, Wisconsin, on August 28. Widely known in the electrical industry, he was a vice president and assistant secretary of Cutler-Hammer, Inc., of Milwaukee.

In addition to having served as an NSPE vice president, he was active in the development of the National Society's programs. In 1946 he had served as president of the Wisconsin SPE. The Engineers Society of Milwaukee named him as its "engineer of the year" in 1953, and he had received a distinguished service citation from the University of Wisconsin in 1951.

At the time of his death Mr. Seeger was general vice president of the Wisconsin State Chamber of Commerce, and it was expected that he would become president of that organization in November.

Here's Construction Report No. 3 . . .

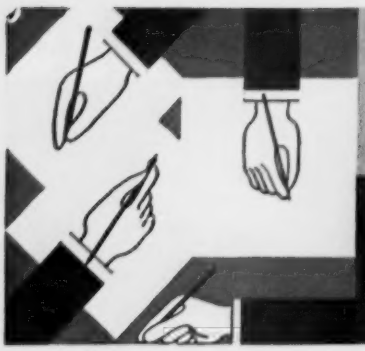
"Construction Report No. 3" shows the completion of the steel and concrete framework for all four floors of the new NSPE headquarters building in Washington, D. C. Progress on the building indicates that it will be ready to house the National Society offices by January, 1956. There is still time for all members to obtain a financial stake in the new headquarters. A total of approximately $65,000 must still be raised to complete the financing of this project. Subscription forms and offering circulars will be sent upon request from the NSPE Washington office.



NAM President To Be Main Memphis Speaker

Henry G. Riter, 3rd, president of the National Association of Manufacturers, will be the principal speaker at the October 14th banquet which will be one of the highlights of the forthcoming Fall Meeting of the National Society of Professional Engineers in Memphis, Tennessee.

The two-day conference, October 14-15, will be held at the Peabody Hotel in Memphis, with members of the Tennessee SPE acting as hosts for the members of the Board of Directors and other engineers and their guests who will attend from throughout the country.



Professional POSTSCRIPTS

Our author for —PP— this month is H. H. Edwards, P.E., of Lakeland, Florida. Although the *American Engineer* tries to bring only *professional* topics to the attention of its readers (leaving the technical field to others), the two areas do, from time to time, necessarily merge. In Engineer Edwards' piece we deal to some extent with the technical, but the over-all intent of the story is an appeal for engineers to show more leadership in this dangerous atomic era in which we live. Now, Engineer Edwards.

—PP—

America stands today in need of a great leader. A leader to show us the way to American survival. We might compare our position to Jericho before her walls came down, to Chicago before the fire, to San Francisco before the great earthquake, to Hiroshima before the bomb. Our nation in this tenth anniversary year of the atmoic age stands vulnerable to destruction.

We know the hazards . . . we know some of the things that must be done to protect ourselves, and yet we do nothing. This condition is to be expected. The mass public has a great inertia and does not move readily to a changing condition. It is the individual who has overcome the inertia of the masses through leadership. Great changes in history have come about from individual leadership. America today stands in need of leadership to show the way to protect our lives, our property, our economy, and our way of life.

Our vulnerability lies in the sudden release of atomic energy creating high pressures, intense heat, and gamma radiation. Atomic energy is heat. If this energy is released gradually over a long period of time, it is the equivalent of coal burning under a boiler. The steam generated may be used to drive a turbine to produce electricity. We thus have an example of a peacetime use of nuclear energy.

If the heat of atomic energy is released almost instantaneously, say in one millionth of a second, we have an atomic explosion. The small bomb dropped on Hiroshima was the equivalent to 20,000 tons of T.N.T. In ten years the atomic super-bomb has grown to the equivalent of one million tons of T.N.T. Tomorrow our enemies could drop a bomb on us one thousand times more powerful than that used at Hiroshima or Nagasaki.

On March 1, 1954, our Government tested a super-bomb on an atoll in the Pacific. This bomb was the equivalent of 14 to 16 million tons of T.N.T. The bomb produced a ball of fire about 3½ miles in diameter. It pulverized the coral of the atoll into a radioactive ash which was sucked up into the sky and distributed by the winds over an area of 7,000 square miles.

Except for the Japanese fishing boat 100 miles away, this radioactive ash settled onto the ocean and was absorbed. If this fall-out, within the 7,000 square miles, had been on land, the continued radiation would have caused the area to be uninhabitable for many days.

OCTOBER MEETINGS Of Note

Petroleum Branch, American Institute of Mining and Metallurgical Engineers—Fall Meeting, Oct. 2-5, Roosevelt Hotel, New Orleans, Louisiana.

American Institute of Electrical Engineers—Fall General Meeting, Oct. 3-7, Morrison Hotel, Chicago, Illinois.

American Society of Lubrication Engineers; American Society of Mechanical Engineers — Joint Lubrication Conference, Oct. 10-12, Antlers Hotel, Indianapolis, Indiana.

National Defense Transportation Association — Annual Convention, Oct. 12-15, Sheraton-Plaza Hotel, Boston, Massachusetts.

Southeastern Association of State Highway Officials—Annual Meeting, Oct. 17-19, Charleston, West Virginia.

National Association of Corrosion Engineers—South Central Regional Meeting, Oct. 18-21, Shamrock-Hilton Hotel, Houston, Texas.

National Council of State Boards of Engineering Examiners—Annual Meeting, Oct. 20-22, Sheraton-Park Hotel, Washington, D. C.

Institute of Management Sciences—Annual National Meeting, Oct. 20-22, Park Sheraton Hotel, New York, N. Y.

Steel Founders' Society of America—Fall Meeting, Oct. 24-25, The Greenbrier Hotel, White Sulphur Springs, West Virginia.

The first plant for the production of atomic bombs cost us $550,000,000. Before the war was over, our Government built two more plants at a cost of $450,000,000 each. These were crash projects, conceived in time of emergency to find the answer under pressure. The bill for these three plants, $1,450,000,000 may have given us a feeling of security. Who else could spend so much money?

The war is over and time has passed. Uranium, the key to atomic energy, is not now considered a scarce ore. The cost of an atomic plant has gone down, the efficiency of the bomb is up, and the production cost is down. We shall have low cost industrial use of atomic energy sooner than we think. Also, the rest of the world is able to produce the deadly bomb sooner than we like.

Today we need a leader to unmask the secrecy of our atomic age, to show the way to counter measures for our survival. He needs to awaken the public to the dangers, and then to show the way.

One of the great neglected phases of our survival plan for tomorrow concerns the structures we live and work in. They are death traps. Not one half of one per cent of our new buildings are being designed as blast-resistant, and yet this needed structural strength could be had at an additional cost of fifty cents to one dollar per-square-foot of floor area. This is only one of the prices we must pay for living in the atomic age. The public will gladly pay so small a figure, if someone will only show the way.

The use of prestressed concrete is one of the great structural tools that has been overlooked in the design of blast-resistant structures. It has the mass to help resist radiation, the strength to resist far better than reinforced concrete, the resiliency required to yield and recover, the sheer strength to resist permament structural deformation, and the weight or mass to give high inertia to the structure allowing it to "wait out" the short duration of a fraction of a second for the peak blast intensity. Prestressed concrete has a cost feature largely overlooked. It can be mass produced as a precasting for long span and heavy loads at a fraction of the cost of reinforced concrete.

Because of Governmental secrecy, structural engineers do not know for what blast pressures to design—ten years after Hiroshima. From trickles of information that have come through, it would appear that a good compromise on selecting a starting figure would be 1,000 pounds per

square foot for a time duration of one fifth of one second.

If we are designing a windowless building, the roof, walls, and floors must be able to withstand the 1,000 pound force for the specified time. When we consider that normal design for snow loads in the North is seldom greater than forty pounds, with wind loads in Florida only 35 pounds, this 1,000 pound figure looms very large. If it were not for the short time interval of the blast, we could not feel so confident of a reasonably low cost solution. However, with prestressed concrete having a high mass, and also elasticity, our design problems are greatly simplified.

Windows and skylights act as air pressure valves which shatter in a blast and allow the blast pressures to enter the building to help equalize pressures on both sides of a wall, roof, or floor. Consequently when we have a blast pressure on both sides of a wall, we have reduced the destructiveness of the forces through equalization. The blast tends to hug the wall from each side.

These air pressure valves are very desirable from the standpoint of survival of the building itself. The walls and roof no longer need to resist the full 1,000 pound per square foot pressure assumed for our windowless building. However, we now have a hazard of flying debris. The building may survive but not the occupants.

Thus, we see the need of a shelter for every building. The shelter will protect the occupants from flying debris, from gamma radiation, and from heat. Proper design for the balance of the building will give a chance of survival for our industrial plants, schools, and homes, instead of their being marked for utter devastation. The public is completely unaware that all our new construction can and should be built for blast survival.

Where are the leaders or teachers to show us the way today before it is too late? Must we wait for another war as our teacher? The future of American survival lies in our action today. Our inertia is too great. We need a neutron in the public eye to overcome our mass inertia.

—PP—

WE BUILD FOREVER
by D. B. Steinman

Mine and quarry yield their treasure;
With sweat and blood, with hope and prayer,
We forge the steel and hew the stone,
And conquer wind, and bridge the air.
We do not waver.
We labor not for instant pleasure;
Our sons will bless our toil and sorrow.
For them this span when we are gone—
A pathway to a bright tomorrow.
We build forever.

Attitude On Consulting By Government Engineers Sought

At the direction of the Engineers in Government Subcommittee of the National Society of Professional Engineers, Executive Director Paul H. Robbins has recently addressed a letter to the heads of various U.S. departments and agencies employing large numbers of engineers. The purpose of the letter is to ascertain policy "regarding professional practice of engineers and other professional employees of the Federal Government outside of their regular employment" and the extent to which such practice is permitted by the agencies.

The agencies queried have been asked to indicate whether or not they think such practice should be encouraged and whether or not any definite policy on the matter has been established. They have also been asked to furnish the subcommittee with copies of any such rules or policies that may be available in written form.

George DeMent, Chicago Commissioner of Public Works, is chairman of the NSPE Subcommittee on Engineers in Government. Other members are L. N. White, W. L. Hindermann, Howard A. Stingle, Walter H. McCartha, Oliver Deatsch, Trigg Twichell, and David Lee.

Virginia Society of Professional Engineers—Annual Meeting, October 6-8, 1955, Roanoke Hotel, Roanoke, Virginia.

NSPE Fall Meeting — October 14-15, 1955, Peabody Hotel, Memphis, Tenn.

Missouri Society of Professional Engineers—Annual Meeting, October 21-22, 1955, Kentwood Arms Hotel, Springfield, Missouri.

North Dakota Society of Professional Engineers—Annual Meeting, November 4-5, 1955, Dickinson, North Dakota.

Arkansas Society of Professional Engineers — Annual Meeting, November 18, 1955, Marion Hotel, Little Rock, Arkansas.

Alabama Society of Professional Engineers—Annual meeting, December 9, 1955, Birmingham, Alabama.

Robbins Participates In Unity Panel

At the invitation of the Pittsfield Section of the American Institute of Electrical Engineers, NSPE Executive Director Paul H. Robbins was one of the participants in a panel discussion on the unity problem which was held in Pittsfield, Massachusetts, under the sponsorship of the AIEE group on September 20.

The discussion was occasioned by the Pittsfield Section's great interest in an effective unity organization for the profession and the desire of the members to familiarize themselves with various current views on the subject.

Mr. Robbins presented the NSPE viewpoint before the panel. Other participants were Dr. Harold S. Osborne, representing the Engineers Joint Council, and D. F. Langenwalter, representing the General Electric Engineers Council.

Each participant gave a ten-minute talk stressing the attitude of the organization which he was representing. This was followed by a round table discussion among the panel members, and then questions were received from the floor.

Minnesota SPE Gets Injunction Against County Surveyor

Through the efforts of the Ethical Practices Committee, Minnesota SPE, an injunction has been issued against a non-registered County Surveyor to prevent practice of professional engineering or land surveying outside of his official duties.

The action was brought by the State Attorney General in the District Court, Second Judicial District. The court held that the County Surveyor be "strictly commanded, perpetually to refrain and desist from practicing or offering to practice in the State of Minnesota either professional engineering . . . or land surveying . . . except in the performance of your official duties as the duly elected and qualified County Surveyor of McLeod County, Minnesota. . . ."

N.S.P.E. Believes

THE MULTI-INTEREST PROFESSION

BY PAUL H. ROBBINS, P.E.

Executive Director

N.S.P.E.

COMMENT is heard from time to time that NSPE concerns itself too much with a particular phase of engineering. Usually this comment is made by a member of the profession not fully informed as to NSPE's many programs. He bases his observation on a particular activity of NSPE affecting an interest of the profession, probably not his own. He may be from industry, commenting upon NSPE's activities on problems as they affect consulting engineers; he may be a consulting engineer, in turn, who sees NSPE's Executive Research Surveys, its concern with the professional status of engineers in industry; he may be a government employee who sees little relationship between some of these aspects of NSPE's programs to those of his own position.

A study of NSPE's many-faceted activities will show that the Society is interested in all aspects of professional development for engineers, regardless of their type of employment or particular interest, for NSPE believes that if the professional status of any segment of the engineering profession is allowed to deteriorate, the whole profession suffers. Thus it is that NSPE is concerned with the problems of the engineer in industry, the engineer in government, the engineer in private practice, and the engineer in education.

Studies are now going on within NSPE on several fronts to make it even more effective in handling these specialized problems. For example, during the past year, the administration of the Society has concerned itself with the organizational structure of several of its committees in order not only that a group of the Society will be concerned with problems of particular groups of engineers but also that the full range of professional development will be considered. A vice president has been assigned to each general area—one covering the education and professional development phase of engineering, a second concerned with the professional practices within the profession, a third concerned with our public relations (both internal and external), a fourth concerned with our interprofessional relations with other societies and professions, a fifth concerned with stimulating activities at the three levels of professional activity (chapter,, state, and national), and the sixth concerned with the organization of NSPE itself so that its internal structure and organization will be continuously effective. These vice presidents, together with the committees under their supervision, are striving diligently to provide the mechanism and outlet through which any particular group within the engineering profession may have an opportunity to present its problems and to seek their solution.

Listed in the following pages of this issue of the AMERICAN ENGINEER are the members of the engineering profession who comprise the Board of Directors of the National Society. NSPE believes the pattern of representation as indicated by this Board of Directors provides a means of considering the problems of professional engineers that has merit on several counts. The national organization has no voice in the selection of these representatives. They come from the four corners of the United States and are sent to the National Board by the state societies. Without exception, all are leading engineers in their local areas and have been chosen because of their abilities to represent the state society at the national level. Members who have had an opportunity of seeing this Board of Directors in action have without exception been impressed with the consideration given to each problem presented to them, the ability of the members as individuals and as representatives of groups of engineers to express their opinion upon the appropriate solution to professional problems, and their sincerity in reaching a solution based upon what is best for the profession rather than any personal concern which may be involved. A unique feature of the meetings of NSPE and its Board of Directors is the fact that all meetings are open to the membership. Members are encouraged to attend.

A second factor to commend the NSPE form of organization is found in our analysis of the diversity of interest of the individual engineers who make up the NSPE Board. Despite the appearance of a number of new faces each year on the Board of Directors as state representation changes, the percentage of national directors coming from various phases of professional employment follows quite closely the percentage of engineers in that type of employment. Thus, a particular problem culminating in recommended national action is viewed from the diversity of interest necessary for careful consideration from all aspects of the profession. The automatic system of checks and balances thus established assures that the policies of the professional society will be determined on the basis of what is best for the profession rather than what is best for any one group. ***End.***

NATIONAL BOARD OF DIRECTORS–1955-56

L. W. Peterson
Alabama

J. O. Martin
Arizona

H. J. Engstrom, Jr.
Arkansas

G. E. Zelhart
California

S. H. Hawkins
Colorado

P. W. Genovese
Connecticut

J. L. Bahr
Delaware

J. H. Powers
District of Columbia

J. E. Kiker, Jr.
Florida

D. B. Lee
Florida

Alabama. L. W. Peterson, P. E., was born in Munising, Michigan, June 18, 1916. He graduated from the Michigan College of Mines and Technology and later took additional courses at the University of Michigan in mining and mechanical engineering. Mr. Peterson held the rank of colonel in the combat engineers during World War II and received the Purple Heart and Bronze Star. He was formerly the president of the Alabama Society of Professional Engineers. He is district manager of The Goodman Manufacturing Company with headquarters in Birmingham, Alabama, and holds memberships in the Birmingham Engineers Club, American Society of Mechanical Engineers and American Society of Mining and Metallurgical Engineers.

Arizona. James O. Martin, P.E., was born in Ottawa, Ontario, Dominion of Canada, Feb. 21, 1905. He received a B.S. degree from Dartmouth College in 1925 and a C.E. degree from Thayer School of Engineering in 1926. He has worked as an engineer and estimator with Adams & Ruxton Construction Co., Springfield, Massachusetts, 1926 to 1945 and as chief of operations with Del E. Webb Construction Co. of Phoenix, Arizona, 1946 to 1953. Since 1954, he has been chief engineer with the J. R. Porter Construction Co. of Phoenix. He has been active in the Central Chapter and in the Arizona SPE since its inception in 1948. Previously, he belonged to the Massachusetts SPE.

Arkansas. Harold J. Engstrom, Jr., P.E., was born and educated in Little Rock, Arkansas, and received his B.S. in C.E. from the University of Arkansas in 1939. He is now chief engineer of the Arkansas Foundry Co. in Little Rock, by which he was first employed as a draftsman at the age of 18. He served for three years as ship superintendent for repair, Bureau of Ships, U. S. Navy. Mr. Engstrom is a past president of the Arkansas SPE. His other offices have included the secretaryship of the Little Rock Engineers' Club and Arkansas Engineers' Club, and the vice-presidency of the Mid-South Section, ASCE.

California. George E. Zelhart, P.E., was born in Cedar County, Missouri, November 8, 1897. He attended Fresno Junior College, 1919-1921, and Stanford University. Since 1925 he has been employed by the Pacific Gas & Electric Company. Prior to that date he was employed by the Southern California Edison at Big Creek, California, and the Pacific Telephone and Telegraph Company in San Francisco. He was among the first to become a registered mechanical engineer in the State of California. He has been active in the Fresno Chapter and the California SPE, having served as president of the latter in 1953-54. He is active in the fraternal and civic groups of his community.

Colorado. S. H. Hawkins, P.E., a native of Colorado, received his BSME degree from the University of Colorado in 1935 and has done extensive graduate work there, as well as at the University of Denver and Colorado State College. For thirteen years following graduation he was engaged in private practice, sales engineering, and construction engineering. Since 1948, he has been in charge of construction for District No. 1 of the Denver Public Schools. He is a charter member of the Professional Engineers of Colorado and has served that society in numerous official capacities, including a 1951 term as president. He is also active in Denver civic affairs.

Connecticut. Philip W. Genovese, P.E., was born in New Haven, Connecticut, January 22, 1917. He received a B.E. degree from Yale University in 1938. He now operates the consulting and design engineering firm of Philip W. Genovese & Associates in Connecticut, and is associated with S. Peter Shumavon of New York for highway work and work outside the State of Connecticut. Prior to the establishment of this firm, Mr. Genovese was a partner in the consulting and design engineering firm of Newman E. Argraves & Associates from 1949 to 1955, and in the firm of Argraves & Mort from 1946 to 1949. He was a lieutenant commander, C.E.C., U.S.N.R. during World War II assigned to underground fuel storage and airfields in Hawaii and Florida. He has been active in the New Haven Chapter of the Connecticut Society of Professional Engineers and is a past president of both the New Haven Chapter and of the Connecticut SPE.

Delaware. John L. Bahr, P.E., was born in Reading, Pennsylvania, December 9, 1899. He was graduated from Carnegie Institute of Technology in 1923 with a B.S. degree in power. He has been with National Vulcanized Fiber Company, Wilmington, Delaware, since 1944. His present position is that of chief engineer. Prior to this, he spent 16 years, 1928-1944, in the heavy

F. E. de Golian, Jr.
Georgia

A. R. Walker
Georgia

E. L. Mathes
Idaho

George DeMent
Illinois

C. L. Klassen
Illinois

L. E. Easley
Indiana

Leland Hobson
Kansas

O. W. Turpin
Maryland

C. M. Adams
Massachusetts

J. H. DeFoe
Massachusetts

chemical industry in charge of power for Diamond Alkali Company of Painesville, Ohio. Before that time, he spent three years in industrial power design and construction of plants and three years in public utilities central stations operating departments. He has been active in the Delaware SPE, serving as president from 1950-51 and later as director from 1952 to the present. He is a member of Alpha Tau Honorary Society, and other engineering groups including Philadelphia Engineers Club and ASME, and also various civic groups. He has also served as a member of the Board of Boiler Rules of Delaware since 1945.

District of Columbia. J. H. Powers, P.E., born April 15, 1902, in Rome, New York, was graduated from the Clarkson College of Technology with the degree of B.S. in C.E. in 1926. He is employed by the U. S. Bureau of Public Roads as a bridge engineer. Mr. Powers was first vice president of the District SPE from 1950-1951 and president from 1951-52. He has also served on various National Society Committees.

Florida. John E. Kiker, Jr., P.E., was born in Americus, Georgia, April 26, 1906. He received an S.B. degree from M.I.T. and an M.C.E. from New York University. After five years of commercial laboratory practice, he spent four years in Indo-China, working for the Layne-New York Co., on the design, construction, and operation of water treatment plants. He also worked briefly in Venezuela on assignment with a consulting firm. From 1936-1947, he was district sanitary engineer with the New York State Department of Health in Poughkeepsie, with the exception of four years of World War II service, advancing to the rank of major and serving lastly as chief, Sanitary Engineering Section, Surgeon's Office, Seventh Service Command Headquarters, Omaha. Since 1947 he has been in charge of the Sanitary Engineering Section, Civil Engineering Department, University of Florida. He has held many chapter and state society offices and was president of the Florida SPE in 1953. He is a member of Sigma Xi, Sigma Tau, and other engineering societies, including the ASCE.

Florida. David B. Lee, P.E., was born in Douglasville, Georgia, September 23, 1907. He received a B.S. in M.E. from the University of Florida in 1932 and an M.S. from Harvard University in 1937. He has held various positions with the State Board of Health since 1932 and has been director of the Bureau of Sanitary Engineering since 1941. During the war he served as a major, Sanitary Corps, Med. Dept., U. S. Army, 1942-45. He has been a special consultant to U. S. Public Health Service on sanitary engineering problems since 1948, and served as an advisor to U. S. Delegation, World Health Organization, Second World Health Assembly, Rome, Italy, in 1949. He served on the President's Commission on the "Health Needs of the Nation" (Panel of Environmental Sanitation, 1952); and he has been a member of the National Research Council, Committee on Sanitary Engineering and Environment, since 1952. He has received many awards and is a member of the Conference of State Sanitary Engineers, the American Water Works Association, the Florida Engineering Society, the American Society of Civil Engineers, and is president of the Federation of Sewage and Industrial Wastes Associations.

Georgia. Felix E. de Golian, Jr., P.E., was born in New Orleans, La., Nov. 4, 1913. He studied at Georgia Tech and graduated from the U. S. Naval Academy in 1937, with a B.S. degree. Since 1939 he has been a member of the Golian Steel and Iron Co., Atlanta, Ga., and is at present vice president and sales manager. His industrial career was interrupted for war service in destroyers which involved, as final assignment, command of the USS Flusser. He holds the Legion of Merit and Bronze Star Medals. Mr. De Golian is interested in poultry husbandry as well as structural engineering. He belongs to the Northside Kiwanis Club and the Atlanta Area Girl Scout Council. He is a member of the Sigma Chi Fraternity.

Georgia. Arley R. Walker, P.E., was born in Seneca, South Carolina, April 22, 1899. He received a B.S. degree in mechanical and electrical engineering in 1920 from Clemson College. He has been with Westinghouse Electric Corporation for approximately 33 years, having served in various capacities and locations. He is now an application engineer handling industrial apparatus in Atlanta, Georgia. Mr. Walker has been very active in the Georgia Society of Professional Engineers. He was a member of the GSPE Organization Committee in 1944, has served on various society committees, and was treasurer for approximately eight years. He is also a member of the Georgia Engineering Society and a number of civic groups.

Idaho. E. L. Mathes, P.E., was born in Stafford, Kansas, February 9, 1913. He received a B.S. in civil engineering from the University of Idaho in 1938 and a degree in traffic engineering from Yale University in 1941. He was also awarded the degree of Professional Engineer from the University of Idaho in 1947. Since 1942, except for a three year tour of duty with the U. S. Army in Europe, he has served as traffic engineer for the Idaho Department of Highways. Prior to his appointment as traffic engineer he served as maintenance engineer for two years and as testing engineer for two years. He has been active in both the Southwestern Chapter and the Idaho Society of Professional Engineers, having served as president of the Southwestern Chapter in 1951 and as president of the Idaho SPE in 1952. He also is serving on the Board of Directors for the Idaho SPE. He is a member of other engineering societies including ASCE and the Institute of Traffic Engineers, and of various professional and civic groups such as ARBA, AASHO, ROA, and the National Safety Council.

Wesley Bintz
Michigan

Otto Hall
Michigan

L. J. Richards
Michigan

W. L. Hindermann
Minnesota

N. T. Rykken
Minnesota

H. O. Croft
Missouri

H. W. Honefenger
Missouri

A. C. Kirkwood
Missouri

C. L. Dier
Nebraska

O. J. Scherer
Nevada

Illinois. George DeMent, P.E., was born in Chicago, Illinois, in 1904. He was educated at the University of Illinois. From 1927 to 1939 he worked on the construction of an Intercepting Sewer System and Sewage Treatment Works of the Sanitary District of Chicago. Since 1939 he has been associated with the City of Chicago, successively as a resident engineer on the first subways in Chicago; as assistant chief engineer in the Department of Subways and Superhighways; as administrative engineer in the Department of Public Works and presently as Commissioner of Public Works.

Illinois. Clarence W. Klassen, P.E., was born in Grand Rapids, Michigan, November 28, 1903. He received a B.S. from the University of Michigan. He has been employed by the Illinois State Department of Public Health since 1925, and has served as chief sanitary engineer of the Department since 1935, with the exception of three years when he served in the Army as chief sanitary engineer of the Eighth Service Command at Dallas, Texas. He is one of the members of the Ohio River Valley Water Sanitation Commission, and of the Council of Consultants of the National Sanitation Foundation. He has been active in the Illinois SPE and served as its president during the past year. He recently completed an assignment for the World Health Organization as a consultant to the British Colonial Government in connection with its sanitary developments in North Borneo.

Indiana. L. E. Easley, P.E., was born October 8, 1908, at Jerseyville, Illinois. He was Indiana state director from 1947-48, vice president in 1949 and 1950 and president, in 1951. Mr. Easley is now senior engineer, Plant Engineers Office, Allison Division of General Motors Corporation, Indianapolis, Indiana. He is in *Who's Who in the Midwest,* is a member of the Building Congress of Indiana, the Indiana Engineering Council and is a Mason.

Kansas. Leland S. Hobson, P.E., was born in Kingman, Kansas, October 6, 1902. He received a B.S. in E.E. from Kansas State College in 1927. Since 1946 he has been a professor engaged in industrial management engineering at Kansas State College, and he has also been associate director of the Engineering Experiment Station since 1952. Professor Hobson was previously associated with the General Electric Company. He has had various offices in the Tri-Valley Chapter of the Kansas SPE, and has for three years been chairman of the Public Relations and Engineers' Week Committee for KSPE (now merged with and known as the Kansas Engineering Society). He has been elected to Sigma Tau, Sigma Xi, and Phi Kappa Phi, is president of the Kansas City Chapter of the Society for Advancement of Management, and is a member of the American Society for Engineering Education, and other engineering and industrial management groups.

Maryland. O. W. Turpin, P.E., was born November 15, 1900, in Washington, D. C. He is a graduate of Baltimore Polytechnic Institute and received his engineering education from Johns Hopkins University in Baltimore. Mr. Turpin is a past president of the MSPE. He is a member of the ASCE, AWWA, and several other organizations. He is a partner in the firm of Turpin, Wachter & Associates in Baltimore.

Massachusetts. Crawford M. Adams, P.E., was born in Groton, Vermont, May 8, 1905. He received a B.S. in E.E. from the University of Vermont in 1928. He later studied towards an M.S. in E.E. at Union College in Schenectady, N. Y. In September, 1928, he entered the Test Engineers' Course of the General Electric Co., in Schenectady, later transferring to induction regulator engineering in Pittsfield, Mass. In August of 1932 he left to teach in Vermont high schools. He returned to the General Electric Co. at Pittsfield in June, 1937. Since that time, except for war service, he has been in distribution transformer engineering doing design and development work. At present, he is in the Advanced Product Engineering Sub-section of Distribution Transformers. During World War II, 1941 to 1946, he served in the Armed Forces of the United States. He holds a commission of lieutenant colonel, USAR. He is past chairman of the Berkshire Chapter, Pittsfield, and has just completed three years as director-at-large for MSPE. He is a member of AIEE and the G. E. Engineers Association. He also belongs to Phi Mu Delta fraternity and is active in Scottish Rite Masons.

Massachusetts. Joseph H. DeFoe, P.E., was born in Westboro, Massachusetts, October 2, 1895. He received his B.S. in C.E. from Tufts College in 1919. Since 1950 he has been director of the Board of Public Works in Wakefield, Mass. Prior to 1950 Mr. DeFoe occupied the following positions: Superintendent of Public Works for Lexington, Mass., 1945-1950; civil engineer with the Esso Standard Oil Company, Boston, Mass., 1943-1945; senior engineer with the Federal Public Housing Authority and the Federal Public Works Administration, 1933-1943; Superintendent of Construction, G. H. Cunningham & Sons Construction Company, Boston, Mass., 1930-1933 and Turner Construction Company, New York, 1920-1930. He is a member of the American Legion, Rotary and many engineering societies and public works associations.

Michigan. Wesley Bintz, P.E., was born in Stanberry, Missouri, October 7, 1891. He graduated with top honors from high school, and then from the University of Michigan where he received his B.C.E. degree with second honors in 1916, and an M.S. degree in 1918. He spent five years in municipal work with the cities of Flint and Lansing, and since 1923 he has spe-

E. R. Boaté
New Jersey

C. C. Colwell
New Jersey

F. G. Manning
New Jersey

A. B. Metzger
New Mexico

C. A. Dutton
New York

A. R. Gruehr
New York

F. J. Johnson
New York

H. A. Mosher
New York

R. B. Rice
North Carolina

E. J. Booth
North Dakota

cialized in the design of swimming pools. During World War II, he worked for the Austin Company in the design of the Douglas Aircraft defense plant in Chicago and was in charge of the main assembly building. Following that he went to Detroit as secretary to the Mayor's Post-War Development Committee. He now lives in Lansing. Mr. Bintz is a past president of both the Michigan SPE and its Grand Valley Chapter. He is a member of the National Exchange, the American Institute of Park Executives, and the National Recreation Association and the author of many articles dealing with his specialized engineering work. He is registered in 18 states and a province of Canada.

Michigan. Otto H. Hall, P.E., was born in Ionia County, Michigan, July 27, 1904. He attended Michigan State College, pursuing courses in civil engineering, followed by special studies in engineering and business. Since 1940, he has been in charge of engineering and architecture for the Michigan Department of Conservation. Prior to that time Mr. Hall held engineering positions with the Civilian Conservation Corps, Road Construction Contractors and State Highway Department. He was one of the organizers of the Michigan Society of Professional Engineers—vice president, 1946-47; president, 1948; and national director, 1949-1955. He served as director for the Michigan Engineering Society four years, has been on several NSPE committees, and currently is chairman of the Ethical Practices Committee. He is also a director of the Lansing, Michigan, Masonic Hi-12 Club.

Michigan. Lester J. Richards, P.E., was born in Coopersville, Michigan, November 4, 1893. He received a B.S. in Mechanical Engineering from the University of Michigan in 1917. He has worked for The Dow Chemical Company ever since graduation, serving successively as draftsman, chief draftsman, assistant chief engineer, chief engineer, and now director of engineering. He has been active in community affairs, serving on the Board of Education for twelve years, and is now president of the Midland Community Center. He has been active in both the Saginaw Valley Chapter and Michigan SPE having served as president of the latter in 1953-54. He is a member of other engineering societies, including ASME. This is his second term as a national director.

Minnesota. Win L. Hindermann, P.E., was born in Fairfax, Minnesota, September 24, 1907. He is an engineering graduate of the University of Minnesota where he received both a B.S. and an M.S. in civil engineering in 1927 and 1929 respectively. He had 22 years of service with the Minnesota State Highway Department, both in the laboratory and in the field. He was a bituminous engineer prior to his assignment as district maintenance engineer at Duluth, Minnesota. He left the latter in 1951 to accept a new position with The Asphalt Institute as its division engineer in the Midwest area. He holds the rank of lieutenant commander in the United States Naval Reserve, having served in Washington, D. C. and the Pacific during World War II. Mr. Hindermann has been active in both the Minneapolis and Duluth Chapters of the Minnesota SPE, having served as president of the latter in 1953. His technical memberships include the American Society of Civil Engineers, Asphalt Paving Technologists, American Road Builders Association, Highway Research Board, Military Engineers, and Sigma Xi.

Minnesota. Nordahl T. Rykken, P.E., was born near Willmar, Minnesota, on May 31, 1904. He received a B.C.E. degree from the University of Minnesota in 1929 and an M.S.C.E. degree in 1931 from the same school. Since 1948 he has been assistant manager of Whitney's, a ready-mixed concrete firm. Prior to this time he was a highway engineer for the U. S. Bureau of Public Roads, field and structural engineer for the Portland Cement Association, and assistant commissioner of Aeronautics for the State of Minnesota. He is a former president of the Arrowhead Chapter, and has served the Minnesota Society as treasurer, director and president. He also served as a former president of the Minnesota Federation of Engineering Societies and is affiliated with the Duluth Engineers Club, and the Minnesota Surveyors and Engineers Society. He is a member of Chi Epsilon, Tau Beta Pi, and Sigma Xi and of the Duluth Chamber of Commerce and the American Concrete Institute.

Missouri. Huber O. Croft, P.E., was born in Denver, Colorado, in 1896. He holds a B.S. in mechanical engineering from the University of Colorado and an M.S. from the University of Illinois. Since 1949 he has been dean of the College of Engineering and director of the Experiment Station of the University of Missouri. Previously he was associated with the faculties of the State University of Iowa, Stanford University, and the University of Illinois. In addition to his activities in the Missouri SPE, Dean Croft is a past president of the Iowa Engineering Society and of the American Society for Engineering Education, and a member of the ASME, the American Rocket Society, Sigma Chi, Tau Beta Pi, and Sigma Xi, and many other professional and civic organizations. He has been awarded the Joint Army-Navy Citation for Civilian War Services.

Missouri. Howard W. Honefenger, P.E., received his degree in mechanical engineering from Washington University, St. Louis, Missouri. He is now St. Louis district manager for the Elliott Company of Jeannette, Pennsylvania. His earlier experience has included work as a construction engineer with the Union Electric Company and with the contracting firm of Bilhorn, Bower and Peters, Inc. He is a charter member and past president of the St. Louis Chapter of the Missouri SPE and a former state director of the latter. He is currently vice president of the MSPE, and

R. A. Freese
Ohio

Ronald Gordon
Ohio

P. A. Harlamert
Ohio

C. A. Dunn
Oklahoma

G. W. McCullough
Oklahoma

C. L. Kreidler
Pennsylvania

R. F. Miller
Pennsylvania

E. K. Nicholson
Pennsylvania

D. C. Peters
Pennsylvania

A. Hernandez
Puerto Rico

he is also a director of the Engineers Club of St. Louis.

Missouri. A. C. Kirkwood, P.E., was born in Colorado Springs, Colorado, June 17, 1900. He graduated from Stanford University in 1923 with an A.B. in M.E. and received an M.S. in E.E. in 1924 from the Massachusetts Institute of Technology. He is in partnership with his son, Thomas, in the Kansas City consulting engineering firm of A. C. Kirkwood & Associates, which he founded in 1947. Prior to that date Mr. Kirkwood was principal engineer for Burns & McDonnell Engineering Company, Kansas City, having joined that organization in 1930. From 1924 to 1929 he was with Wood & Weber, consulting engineers in Denver, Colorado. Mr. Kirkwood is president-elect of the Missouri SPE, was chairman of its Western Chapter, and for two years was that chapter's state director. He is past president of the Engineers Club of Kansas City, and a member of the Rotary Club of Kansas City and several engineering societies. He has served for many years as a director of the Kansas City Area Council, Boy Scouts of America.

Nebraska. Clifford L. Dier, P.E., was born in Hastings, Nebraska, May 14, 1904. He received a B.S. in C.E. from the University of Nebraska in 1939. Since 1946 he has been a senior partner in the engineering firm of Harold Hoskins & Associates of Lincoln, Nebraska. He has been active in both the Southeast Chapter and the Nebraska SPE. He served in the U.S. Army from 1940 to 1946 and was released from active duty in 1946 as a colonel of infantry. He is active in the army reserve and is the current president of the Nebraska Department, ROA. He is a member of ASCE and ASTM, as well as masonic and civic groups.

Nevada. O. J. Scherer, P.E., was born in Switzerland, July 27, 1902. He received his education in civil engineering in Switzerland and immigrated to the United States in 1926. From 1926 to 1932, he was employed in Los Angeles by the Southwestern Engineering Corporation and by the Fluor Corporation. In 1932 he became self-employed, conducting a construction and consulting engineering business. In 1952 he discontinued the construction phase of his business, and he now devotes his entire time to consulting engineering and the operation of the Nevada Testing Laboratory in Las Vegas. He is a past president of both the Las Vegas Chapter and the Nevada SPE.

New Jersey. E. R. Boaté, P.E., was born in Brooklyn, N. Y., and achieved his engineering education at Columbia University and through Cooper Union Institute and Rutgers University extension courses. He was chief engineer of the North Jersey Quarry Co. for 18 years; then was vice-president and treasurer of Bacon-Pietsch Co., New York City; and now is president and consulting engineer with his own firm, E. R. Boaté Co., Inc. He is also serving as city engineer of Rahway, N. J., and is a past president of the Professional Engineers Society of Union County.

New Jersey. Curtis C. Colwell, P.E., was born in Buffalo, New York, March 18, 1889. He received a B.S. in C.E. from Carnegie Institute of Technology in 1912. Since 1944, he has been county engineer and supervisor of roads of the County of Essex, N. J., following 15 years as assistant county engineer. His early experience was with such companies as Turner Construction Company, E. I. du Pont de Nemours & Co., and the Lackawanna Railroad Company. He was a lieutenant in the Corps of Engineers, World War I. He is president of the New Jersey Association of County Engineers, past president of the Essex County Society of Professional Engineers, and he has long been active in the New Jersey SPE. He is deputy coordinator, Department of Civil Defense and Disaster Control, Essex County. He is active in numerous civic and veteran groups including the Caldwell-West Essex Kiwanis group, of which he is past president, and the American Legion.

New Jersey. Frank G. Manning, P.E., is a native of Jersey City, N. J. He received a B.S. in C.E. from Newark College of Engineering in 1932, and an M.C.E. from New York University in 1940. Since 1950 he has been chief engineer, department of Public Works, City of Jersey City. He is a consulting sanitary engineer and is technical director, Jersey City Incinerator Authority. Mr. Manning was engineer for the Interstate Sanitation Commission from its inception in 1937 to 1950, except for service in World War II, Sanitary Corps, A.U.S., lieutenant to major. He is active in the Hudson Chapter and in the New Jersey SPE. Last term he served as alternate national director, NJSPE. He is a member of APHA, APWA, and various other engineering societies and civic groups.

New Mexico. A. Burton Metzger, P.E., was born in New York City, June 10, 1896. He is an electrical engineering graduate of Pratt Institute, Brooklyn, New York, and a member of the Board of Directors of the Pratt Institute Engineers Alumni Association. Since 1922, he has been in the employ of the Western Electric Company, and on December 1, 1950, was assigned to Sandia Corporation, Albuquerque, New Mexico, on a loaned basis as special consultant. In September, 1951, his temporary assignment was changed to an indefinite leave of absence to Sandia Corporation as director of Safety Assurance. He has served the Maryland, New Mexico, and National Societies of Professional Engineers in various capacities during the past ten years and is at present a member of the National Committee on Resolutions. He is a former associate professor, College of Engineering Extension, and a former lecturer on Industrial Hygiene, College of Education, of the University of Maryland. He is president of the New Mexico Council of Technical and Scientific Societies, a member of the Society of American Military Engineers, and Sigma Phi Delta and Iota Lambda Sigma fraternities.

New York. C. A. Dutton, P.E., born

H. F. Carpenter
Rhode Island

R. K. Rouse
South Carolina

W. F. Moehlman
Tennessee

Noah E. Hull
Texas

Trigg Twichell
Texas

C. M. Ware
Utah

J. B. McGaughy
Virginia

K. M. Wood
Washington

L. C. Gates
West Virginia

H. G. Kennedy
West Virginia

January 1, 1899, at Oneida, New York, is a graduate of the Massachusetts Institute of Technology with an S.B. in general engineering. He is now vice president, company director, and manager of construction sales for the Buffalo Electric Co., Inc. He was president of the Erie County Chapter of the New York State SPE in 1950-51. He has held several offices on the state level and has been active on national committees; currently he is serving as chairman of the Resolutions Committee. He is a member of Rotary, the Buffalo Chamber of Commerce, the American Legion, the Niagara Falls Country Club, and several other organizations.

New York. Anatole R. Gruehr, P.E., began his engineering education in "Polytechnicum," Zurich, Switzerland. He received the degree of B.S. in E.E. from M.I.T., and M.B.A. and Ph.D. from the Graduate School of Business Administration of New York University. Since 1926 he has been associated with the Consolidated Edison Company of New York, where he is now senior engineer. He is also adjunct professor of economics at the Polytechnic Institute of Brooklyn, and visiting associate professor of industrial engineering at Stevens Institute of Technology. He has served as president of the New York Chapter of NYSSPE, as chairman of several chapter and state committees and as national chairman of the Engineers' Week Committee. He is now state zone director, as well as being national director. In 1952 he received the Distinguished Service Award of the New York Chapter. He is a member of AIEE, ASEE, and of various local organizations.

New York. Franklin J. Johnson, P.E., is a native of Columbus, Georgia. He received his B.S. in C.E. from the Georgia Institute of Technology in 1924. He has been with the Consolidated Edison Company for twenty-five years, now being senior engineer, Distribution Structures Bureau, supervising development and standardization of new equipment and transmission methods. His earlier experience included one year as a junior engineer with a consulting firm and five years with Henry L. Doherty and Company. He has been president of the Queens County Chapter of the New York State SPE and has also served on various chapter and state committees. He is a member of the American Institute of Electrical Engineers, the American Wood Preservers' Association, the Mid-Village Civic Association, and other groups.

New York. Harold A. Mosher, P.E., is the assistant director of engineering for the Eastman Kodak Company at the Kodak Park Works, Rochester, New York. He is a native of Oklahoma City, and his educational background includes a B.S. degree from Occidental College in Los Angeles, California. His other engineering affiliations are with the American Society of Mechanical Engineers and the American Society of Heating and Air-Conditioning Engineers.

North Carolina. Robert B. Rice, P.E., was born in Woods Hole, Massachusetts. He was awarded his B.S. in M.E. from Tufts College in 1926 and his M.E. degree in 1930. He earned the A.M. degree at Columbia University in 1936. Since 1936 he has held the following positions in the University of North Carolina: associate professor of M.E., professor of M.E., professor of experimental engineering, and professor of internal combustion engines. During the war he was appointed head of the Department of Mechanical Engineering and is now head of the Department of Diesel and I.C. Engines. He has served as governor and president of the North Carolina State Society. He has held many offices of various engineering societies including state presidency of ASME and ASHAE. He is a member of Tau Beta Pi, Pi Tau Sigma, Zeta Psi, and national and local civic groups. He is a member and past president of the N. C. Registration Board.

North Dakota. Edward J. Booth, P.E., was born in McClusky, North Dakota, July 14, 1910. He attended North Dakota State College School of Engineering. From 1933 to 1943 he was employed by Emergency Federal Works Agencies in an engineering capacity on various public works projects. Since 1943 he has been City Engineer of the City of Bismarck, North Dakota. He is a member of the American Public Works Association, The American Water Works Association, and a past president of the North Dakota Society of Professional Engineers.

Ohio. Raymond A. Freese, P.E., is a native of Cleveland and received his degree in Civil Engineering from Case Institute of Technology. He is division building manager of Armco Drainage and Metal Products, Inc. at Middletown, Ohio, having recently transferred from Cleveland where he served the same company as district manager for more than ten years. Prior to his affiliation with Armco, he was associated with a consulting engineering organization, contractor's engineer, and with the Ohio Highway Department as assistant division engineer. He is a charter member of the Cleveland SPE and held various chapter offices including the presidency in 1949. He is a past president of the Ohio SPE and is currently serving as chairman of NSPE's Inter-Professional Relations Committee.

Ohio. Ronald A. Gordon, P.E., was born in Morgan County, Ohio, January 18, 1910. He received a B.C.E. degree from Ohio State University in 1935. From 1935 to 1939 he was a highway engineer in Ohio. In 1940 he became associated with the Clinton Construction Company at Wilmington, Ohio. In 1946, Mr. Gordon became a partner and the company expanded into the concrete business. In 1953 the contracting part of the business became The Clinton Asphalt Paving Co., which Mr. Gordon now serves as president. He has

R. C. Clark
Wisconsin

Harold Trester
Wisconsin

served two terms as vice president of Ohio SPE, and he is active in various business and civic groups.

Ohio. Paul A. Harlamert, P.E., was born in Kettlersville, Ohio, August 1, 1905. He received a B.S. in M.E. from Ohio State University in 1927. After four years of night school study, he received an LL.B. degree from Columbus College of Law. He passed the bar examination in January, 1932. From 1927 to 1932 he was design and sales engineer for Hydraulic Press Manufacturing Company. He practiced law in Columbus, Ohio from 1932 to early in 1935. Since May 1, 1935, Mr. Harlamert has been commodity manager, Johns-Manville Corporation, Cleveland, Ohio. He has been active in both the Cleveland Chapter and Ohio SPE, having served as president of both. He has served on several NSPE committees and is also active in the AWWA and FSIWA.

Oklahoma. C. A. Dunn, P.E., was born in Stocking, S. D., September 9, 1901. He received a B.S. in C.E. from Wisconsin University, C.E. and M.S. degrees in C.E. from Oklahoma A&M College, and a Ph.D. in C.E. from Cornell University. Since 1945 he has been executive director of the Division of Engineering Research and professor of civil engineering, Oklahoma Institute of Technology, Oklahoma A&M College. He was president of OSPE in 1948. Dr. Dunn is a member of the ASCE, American Society for Engineering Education, Phi Kappa Phi, Sigma Tau and Chi Epsilon, and various civic groups. He is listed in *Who's Who in America.*

Oklahoma. Gerald W. McCullough, P.E., was born in Lynnville, Indiana, April 1, 1904. He received a B.S. in M.E. at Oklahoma A&M College, 1925. He was employed by Phillips Petroleum Company in 1925, and worked in Natural Gasoline & Gas Department until 1943, becoming chief engineer in 1937. He was made assistant manager, Defense Plant Division, 1943, and manager, 1944. He was appointed vice president and general manager, Phillips Chemical Company, wholly owned subsidiary of Phillips Petroleum, in 1948, and executive vice president and general manager, 1951. He became chairman, Operating Committee, Phillips Petroleum Company and subsidiaries, 1951, and vice president, Phillips Petroleum Company and chairman, Operating Committee in 1953. He was second vice president of the Oklahoma SPE in 1951 and president in 1952. He has also been a member of the OSPE Planning Board. He is active in Rotary and various civic groups.

Pennsylvania. Carl L. Kreidler, P.E., was born in Freemansburg, Pennsylvania, July 25, 1907. He received a B.S. in C.E. from Lehigh University in 1920 and an M.S. in C.E. from the same school in 1932. He has been chief structural engineer of Lehigh Structural Steel Co., Allentown, since 1947. He started with the company as a draftsman in 1936. Currently he is president of the Pennsylvania SPE; he is also a past president of the Lehigh Valley Chapter. He is a member of the Welding Research Council; the Committee on Building Codes, AWS; and the Pennsylvania Sewage and Industrial Waste Association. He has had technical papers in various welding journals, also reprinted by ASCE.

Pennsylvania. Robert F. Miller, P.E., of Tamaqua, Pa., is a consulting engineer to a number of Schuylkill County municipalities and industries. A past president of the Pennsylvania SPE, he has long been recognized for his work in behalf of the profession. He was one of a group of members of the Reading Chapter who helped organize the new Anthracite Chapter in 1946 and later served it as president and state director. Mr. Miller was also one of the leaders of the group which successfully promoted the registration law passed by the Pennsylvania Legislature in 1945. He is also known for his work in Lions International and for his interest in community service. He also belongs to the AIMME, SAME, the Engineers' Society of Pennsylvania, and the Pennsylvania Sewage and Industrial Wastes Association.

Pennsylvania. E. K. Nicholson, P.E., born May 23, 1899, Lakewood, Ohio, graduated from Ohio State University with a B.M.E. in 1921 and an M.E. in 1928. He is a member of the Union League of Philadelphia, the Franklin Institute, ASME, and Phi Kappa Psi. Mr. Nicholson has held several offices on the state and national levels. Presently, he is chief engineer of Rohm & Haas Company's Lennig Plant in Philadelphia.

Pennsylvania. D. C. Peters, P.E., president and general manager of the Mellon-Stuart Company, Pittsburgh contracting engineers, graduated from Marquette University in 1938 with a B.S. in C.E. He is a member of various engineering societies, as well as the Young Presidents' Organization, and has been active in civic and civil defense planning in the Pittsburgh area. He has been chosen as one of one hundred young leaders of Pittsburgh's future by the local Chamber of Commerce and *Time Magazine* jointly.

Puerto Rico. Alberto Hernandez, P.E., was born June 6, 1903, in Mayaguez, P.R. He received a B.S. in C.E. from the University of Puerto Rico in 1926 and an M.A. from Harvard in 1935. He has taught in the University of Puerto Rico's College of Agricultural and Mechanical Arts and has done engineering work in various capacities with agencies of the Island's government. He is now chief, Technical Section, Puerto Rican Field Office, Public Housing Administration. He is a member of numerous professional engineering groups and of the New York Academy of Sciences.

Rhode Island. Howard F. Carpenter, P.E., was born in Providence, Rhode Island in 1909. He attended schools in Newport and Providence. Since 1950, he has been chief of the Sanitation Division of the Public Works Department of the City of Providence. Prior to 1950, he was superintendent of the city sewage disposal plant and served in other capacities in the Engineering Department of the City of Providence. Mr. Carpenter is a past president of the Rhode Island Society of Professional Engineers and a member of the American Public Works Association, the Federation of Sewage and Industrial Wastes Associations, and the New England Sewage and Industrial Wastes Association. He is also secretary of the New England Chapter of the American Public Works Association.

South Carolina. R. King Rouse, P.E., was born March 15, 1905, in Valdosta, Georgia. His academic and technical education was secured through attendance at schools in his home state and included the study of mechanical engineering at the Georgia School of Technology. During 1936 he organized his present firm, R. K. Rouse Company, which represents several manufacturers of heating equipment. He has been a member of NSPE since 1943 and was active in organizing the South Carolina Society, being its first president in 1948. He holds membership in Rotary and other local and national organizations, including the Society of American Military Engineers and ASHAE. He is president of the South Carolina Chapter of the latter.

Tennessee. William F. Moehlman, P.E., was born in Madison, Wisconsin, August 7, 1897. He received his B.S. in C.E. at the University of Wisconsin in 1922. Since 1934 he has been active in business in Tennessee in a number of enterprises. He is president of Knox Concrete Products, Inc.; president of General Aggregate Corporation; president, Southeastern, Inc.; vice president, Tenn. Metal Culvert Co.; director, Concrete Products Co.; and director, Home Federal Savings & Loan Assn. He has been active in both Tennessee SPE and the Knoxville Chapter. He is past president of the Tennessee Valley Section of ASCE and a member of AAE and the Knoxville Technical Society. He has been active in civic affairs and served as president of the Knoxville Chamber of Commerce for three years.

Texas. Noah E. Hull, P.E., was born in Defiance County, Ohio, and educated in public schools in Noble County, Indiana. He received a B.S. in C.E. from Purdue University in 1917. Since January, 1951, he has been vice president and general manager, Hughes Gun Company, Houston, Texas, operating Dickson Gun Plant for the Army Ordnance Corps. Prior to this assignment, Mr. Hull spent 12 years with General Motors Corporation in construction and plant engineering work; four years as plant engineer, Firth Carpet Co.; four years as chief engineer for National Gypsum Co., operators Bluebonnet Ordnance Plant, McGregor, Texas, and five years (1946-1951) as manager, Plant Engineering Division, Hughes Tool Company. He has been active in the San Jacinto Chapter and Texas Society as chapter officer and TSPE director-at-large. He is a member of Triangle and Tau Beta Pi, Houston Engineers Club, ASCE, American Ordnance Association, Rotary Club, and the Houston Club, and is active in various civic groups.

Texas. Trigg Twichell, P.E., was born in Austin, Texas, June 24, 1901. He received a B.S. in Civil Engineering from the University of Texas in 1925. He has

(Continued on page 35)

NEW Processes . . .

Cracking Plants With Catalytic Boilers Feed On Own Exhaust Gases

Two giant Houdriflow cat crackers—one each at Sun Oil Company's Toledo, Ohio, and Marcus Hook, Pa., refineries—make use of special catalytic waste-heat boilers to burn their own flue gases before they reach the atmosphere and in so doing generate a total of 100,000 pounds of process steam an hour. The novel oxidation catalyst is known as the Oxycat, manufactured by Oxy-Catalyst, Inc., Wayne, Pa.

Each Oxycat—there are more than 20,000 of them installed in catalytic waste-heat boilers at Sun's two new plants—is a brick-size structure consisting of 71 slender porcelain rods suspended between two square porcelain end-plates.

A thin catalytic coating on the Oxycat rods oxidizes the carbon monoxide and hydrocarbon oil vapors in the cat cracker exhaust to a clean effluent of carbon dioxide and water vapor. The process is accompanied by a tremendous release of heat energy.

To Sun, this heat release—a total of 110,000,000 Btu per hour at the two plants—is the potential source of a $400,000 a year fuel saving. That is the cost of the fuel—some 150,000 barrels of oil a year—that would be needed to supply steam to the cat crackers if it weren't for the Oxycat waste-heat boilers.

Since the waste-heat boilers cost Sun $800,000 they will pay for themselves in fuel savings within two years. After that, they will be producing free steam and at the same time will provide continuous insurance against air pollution.

The flue gases fed into the Oxycat waste-heat boiler come from the regeneration of another catalyst used in the refining plant—the cracking catalyst. This is the catalyst which, when brought into contact with hot crude oil, converts the oil into high octane gasoline. In the cracking process, unburned carbon—about eight tons an hour—is deposited on the surface of the cracking catalyst.

Before the catalyst can be re-used in another cracking cycle, this carbon must be removed. The regeneration is accomplished by subjecting the coated cracking catalyst to a blast of hot air that burns off the carbon. The resulting flue gases contain a substantial amount of carbon monoxide and traces of entrained oil vapors.

These gases—some 200,000 pounds of them an hour at Toledo—enter the Oxycat bed at 900 degrees Fahrenheit. They flow up across the Oxycat rods where they come into contact with the catalytic coating. A catalytic chemical reaction then causes the combustible gases to burn at a temperature that would be too low to support flame ignition. This catalytic oxidation raises the gas temperature to 1500 degrees.

These energy laden gases then pass up through the equivalent of a power house boiler. There the heat generates steam in the boiler tubes. The clean exhaust is finally vented safely to the atmosphere.

Sun uses most of the steam to drive turbines, which in turn drive the compressors which compress the air used for catalyst regeneration.

The waste heat boiler also contains supplementary oil burners downstream from the catalyst bed. These are fired to start cracking plant.

These Oxycats — part of a bed of 10,000 such catalytic elements at Sun Oil Company's Marcus Hook, Pa., refinery—digest carbon monoxide and hydro-carbon bearing gases exhausted from one of Sun's new Houdriflow petroleum cat crackers.

Penetration of Protective Coating Traced Through Radioactivity

The "eyes" of radioactive tracing technique have been utilized to accomplish many important advancements as Atomic research assumes an ever-growing role of importance as an invaluable right hand to industry. One of the latest and most unusual developments, incorporating radioactive tracing, was to actually trace the penetration of a fish-oil-based protective coating through rust to bare metal, after the coating had been applied directly over rusted metal surfaces. The development of a method to determine the degree of penetration of a fish-oil-based protective coating into rust on steel specimens was the problem that the Rust-Oleum Corporation placed in the hands of Battelle Memorial Institute technologists who made the tests.

Radioactivating test batches of the primer coating with C^{14} radioisotope then applying the radioactivated coating to rusted test panels, and finally, lapping the coated test panels at 0.5 mil layers and taking radioactivity measurements at each level did the trick. However, behind this method and the results which were obtained, is a story of nearly three years of continued research. *First*, it was necessary to identify one or more of the major chemical constituents in the fish-oil-based vehicle of the coating. *Second*, this constituent was synthesized, using radioactive C^{14}. *Third*, the C^{14} labeled constituent was added to the fish-oil-based vehicle making it radioactive. The radioactive vehicle was then processed by the manufacturer into a radioactive coating equivalent to the manufacturer's standard product. *Fourth*, the radioactive coating was applied to rusted steel test panels and allowed to dry for two weeks. *Fifth*, the coated test panels were shaved downwards from the surface at 0.5 mil intervals and radioactivity measurements taken at each level down to bare metal.

Lengthy research alone was devoted to examination of the fish oil vehicle to determine which components would be most suitable for radioactive tracer synthesis studies. It was found that a major component, common to all

fish oils, is glycerol in the form of triglycerides. The glycerol portion of the fish oil was then replaced by C^{14} labeled glycerol. This was done by obtaining the fish oil fatty acids by saponification of fish oil, followed by re-esterification of these fatty acids with C^{14} labeled glycerol, thereby obtaining a radioactive re-constituted fish oil.

Equally important was the extensive testing and evaluating devoted to establishing that the re-constituted fish oil was identical in every way to the original oil. In addition to months of laboratory testing, the manufacturer conducted exhaustive tests in laboratory weatherometers and in the extremes of atmosphere exposure areas throughout the country to be sure that the synthetic procedures used in the research to radioactivate the fish oil did not change standard product performance.

After more than one year of testing the radioactivated coating, the procedures to measure the penetration through rust were started. To actually determine the degree of penetration of the coating into rust, seven badly rusted steel test panels were used with complete logs maintained on each specimen. These test panels were scraped and wirebrushed in conformance with the coating manufacturer's standard directions for application. The radioactive primer was then brushed on directly over the sound rusted surfaces and allowed to dry for two weeks. Following this, the coated test panels were placed in a lapping fixture that made possible controlled removal of the surface layer using crocus cloth as an abrasive. The surface was then lapped at an approximate 0.5 mil levels down to the bare metal surface and the radioactivity in the coating measured at each level.

The results, as carefully recorded by Geiger-Mueller tube and Gas Flow Proportional Counter, show that the protective coating does penetrate through the rust to the bare metal with approximately 15% of the surface radioactivity being found at bare metal. Also revealed was the fact that the coating pigment and fish oil vehicle combined penetrate to about 4.5 mils in depth. From there the fish oil vehicle alone penetrates through the remaining rust to the bare metal surface at approximately 6.0 mils distance from the coating surface.

A copy of the thirty-page report on Rust-Oleum penetration as prepared by Battelle Memorial Institute technologists, may be obtained by request on business letterhead to the Rust-Oleum Corporation, 2799 Oakton Street, Evanston, Illinois.

Board

(Continued from page 33)

been employed by the United States Geological Survey, Texas District, in positions ranging from junior hydraulic engineer to district engineer, with special assignments in other sections of the country, from 1925 to the present date. In October 1948, he was appointed as the Geological Survey representative on the Interior Department's Regional Planning and Coordinating Field Committee covering eight states of the Southwest. He is a charter member of Texas Society of Professional Engineers and served as president in 1948. He has been active in the ASCE and AGU, in addition to NSPE. He is a member of Chi Epsilon, honorary civil engineering fraternity, Engineers' Ramshorn Club, and various civic and engineering groups.

Utah. Charles M. Ware, P.E., was born in Salida, Colorado, June 12, 1899. He received a B.S. in M.E. from Colorado University in 1923 and an M.E. from the same school in 1928. Since 1932 he has been the proprietor of the engineering supply firm, Photo-Blue Company. Prior to 1932 Mr. Ware was assistant superintendent of an oil refinery, industrial engineer for a natural gas firm and spent some years in power plant work. He served as president of the Utah Society of Professional Engineers in 1940-1941. He is a member of Sigma Tau, Kiwanis and other fraternal groups.

Virginia. J. B. McGaughy, P.E., born November 5, 1914, in Norfolk, Virginia, received a degree of B.S. in C.E. from Duke University in 1938. He is a past president of the VSPE and is a member of the Engineers Club of Hampton Roads, American Concrete Institute, Rotary Club, Virginia Club and Norfolk Yacht & Country Club. Mr. McGaughy is a partner in the firm of Lublin, McGaughy and Associates, Architects and Consulting Engineers, Norfolk, Virginia and Washington, D. C.

Washington. Kendall M. Wood, P.E., was born in Kansas City, Missouri, February 26, 1909. He received his B.S. in mechanical engineering from the University of Kansas in 1933. Since 1945 he has been in private practice, first as a partner in Daugherty Engineering Services and, since 1949, as sole owner, Kendall M. Wood & Associates. Prior to entering private practice he spent eight years as a civilian engineer with the U.S. Army Engineers. He has been active in both Spokane Chapter and the Washington SPE, serving as president of Spokane Chapter in 1952-53 and state president in 1954-1955. He is also an active member in ASME and ASHAE. Civic activities include Rotary and Shrine memberships.

West Virginia. Leslie C. Gates, P.E., was born at Dorothy, West Virginia, November 17, 1918. He received a B.S. in C.E. from Virginia Polytechnic Institute in 1940. For a period of one year he worked for the Solvay Process Company on plant expansion in Hopewell, Virginia. In 1941 he entered the service and was a major in the Corps of Engineers when he was released to inactive status in 1946. Since 1946 he has been an Associate in the Ferguson-Gates Engineering Company, a consulting firm dealing primarily with the mining industry. He was first president of the Appalachian Chapter and was the president of the West Virginia SPE in 1951. He is a member of AIME and ASCE, past president of the Beckley Area Chamber of Commerce, and an elder in the Beckley Presbyterian Church.

West Virginia. Harry C. Kennedy, P.E., was born in Coal Run, West Virginia, May 19, 1903. He received a BSEM degree in 1926 and an MSEM degree in 1928 from West Virginia University. He practiced as a combustion engineer from 1928 to 1932. In 1932, he became associated with the Kanawha Coal Operators' Association and he has been the organization's executive secretary since 1943. He is a past president of the West Virginia SPE; a member of AIME and the Kanawha County School Board; and chairman of the Advisory Committee on Scientific, Engineering, and Specialized Personnel, West Virginia State Headquarters, Selective Service System.

Wisconsin. Richard C. Clark, P.E., was born in Albany, Wisconsin, February 25, 1898. He received his education at the University of Wisconsin and has been with the State Highway Commission of Wisconsin continuously since 1919, serving in the following capacities: surveyor, chief of party, resident engineer, office engineer, assistant division engineer, and, at present, district engineer at Superior, Wis. From 1941 to 1943, Mr. Clark was a part-time instructor for the University of Wisconsin. From 1941 to 1954, he was a part-time consulting engineer. He is a member of the Wisconsin Society of Professional Engineers and has served the society in the following capacities: state director, second vice president, first vice president, president (1952-1953), and national director. Mr. Clark is a World War I veteran.

Wisconsin. Harold C. Trester, P.E., was born in Sheboygan, Wisconsin, July 3, 1911. He received a B.S. in C.E. from the University of Wisconsin in 1935. Since 1948 he has been an associate in C. R. Meyer and Sons Company, Contractors and Engineers, in Oshkosh. Prior to this, Mr. Trester was with the Wisconsin Highway Commission from 1935 to 1939; structural engineer with Cook & Brown of Oshkosh from 1939 to 1942 and 1945 to 1948; and district structural engineer with the U.S. Engineers, Savannah, Georgia, from 1942 to 1945. He has been active in both the Fox River Valley Chapter and the Wisconsin SPE, having served as chapter president in 1949, state director in 1950, and national director in 1954. He is a member of Chi Epsilon, Tau Beta Pi and Triangle, and other engineering societies including ASCE and ACI.

NSPE Executive Committee Reviews Society Programs

The members of the Executive Committee of the National Society met in Washington, D. C., at the Statler Hotel, August 26-27, to review the progress of various Society programs and discuss a number of problems of immediate concern to the profession. Among the general topics covered in the two-day agenda were unity, patent practice and policy, and NSPE's position in regard to the Wage-Hour Law.

Various members of the NSPE headquarters staff were also present at the meeting to provide background information and make their official reports.

STRICTLY BUSINESS

Personalities . . . **H. J. Buttner** has been appointed manager of engineering for the **Le Roi Division** of **Westinghouse Air Brake Company** in Milwaukee, Wis., according to **Paul I. Birchard,** vice president and general manager. . . . **J. A. Keeth** has been elected a vice president of the **Kansas City Power & Light Company,** Kansas City, Mo., according to **H. B. Munsell,** president. . . . **Marvin A. Kagan** has been appointed chief engineer of **Shane Manufacturing, Inc.,** Chicago heating and air conditioning manufacturing firm. . . . **Thomas R. Darmody** of Philadelphia has been named an assistant general manager of **Vitro Engineering Division,** New York, according to **George White,** executive vice president, **Vitro Corporation of America.** Also, **Armand J. Thieblot** of Hagerstown, Md. and Washington, D. C., president of **Thieblot Aircraft Company, Inc.,** Bethesda, Md., has been elected a director of **Vitro Corporation of America.** . . . **Howard C. Gebhart** has been named chief engineer of the Bellefontaine, Ohio **Delta Power Tool Division** of **Rockwell Manufacturing Company,** succeeding **John B. Unterweger** who has been promoted to factory manager.

Mr. Buttner

Henry Aaron, former CAA chief of Airports Technical Branch, has been named highway and airport engineer of the **Wire Reinforcement Institute,** a Washington, D. C. trade association. . . . The New York consulting firm of **Seelye Stevenson Value & Knecht** has announced that **Jack L. Staunton,** chief sanitary, hydraulic and petroleum engineer, has been made an associate of the firm. . . . Announcement has been made by the Atlanta, Ga. firm, now operating as **A. Thomas Bradbury & Associates,** Architects, Engineers, of the association of **Cherry L. Emerson,** consulting engineer, and **Robert A. Schoenberner,** architectural designer. . . . **W. R. Saucy,** president of **Flambeau Plastics Corporation,** Baraboo, Wis., has announced the appointment of **Robert Fejta** as plant engineer to direct an expansion program. . . . **Ray Fortune** has been appointed director of development engineering for **The Standard Register Company,** Dayton, O., according to an announcement by **John Davidson,** vice president, engineering and research. . . . It has been announced that **Raymond Yong** has joined the engineering staff of **SOILTEST, Inc.,** Chicago.

Mr. Staunton

Conard M. Kelley has been employed by the **National Lime Association,** Washington, D. C., to provide technical information and service to highway engineers; he will make his headquarters in Garland, Tex., temporarily. . . . **M. A. Ellsworth** will head the new engineering and construction division of **The Fluor Corporation, Ltd.,** Los Angeles, as vice president and general manager; the new division, representing an operating realignment, will be organized effective November 1. . . . **C. H. Case** has been appointed a division manager for the **Kaiser Engineers Division** of **Henry J. Kaiser Company** in Oakland, Calif. . . . Announcement has been made of the following appointments in the firm of **Charles Simkin & Sons, Inc.,** engineering contractors of Hopelawn (Perth Amboy), N. J.: **Joseph Dobransky,** field superintendent; **Alexander Sage,** vice president in charge of engineering; **Robert Solmor,** chief piping engineer; and **Edward Greenwald,** chief air conditioning engineer. . . . **William Moreland** of Rockford, Ill., has been elected vice president in charge of manufacturing for **The F. E. Myers & Bro. Co.,** Ashland, O., according to **Curtiss Ginn, Jr.,** president.

Mr. Kelley

Ownership Changes . . . The **C. H. Wheeler Manufacturing Company** of Philadelphia has taken over the **Cruse-Kemper Company** plant at Ambler, Pa. The steel plate fabricating plant and the field erection and gas holder inspection and repair business of Cruse-Kemper will now be operated as the **Cruse-Kemper Division** of the C. H. Wheeler firm. . . . The **Electric Service Engineering Co.,** Joliet, Ill., which specializes in the design and manufacture of electrical and electronic devices, has been purchased by the **H. K. Porter Company, Inc.,** of New York, according to **T. M. Evans,** president. The purchased firm will now be known as the **Eseco Division** of the company, "Eseco" having been the Joliet organization's trade name.

New Firm . . . **O. H. Berry** of Wichita, Kan., and **Charles E. Phillips** of Houston, Tex., announce the formation of **Berry and Phillips,** a consulting petroleum engineering firm, with offices in Midland, Tex. The new firm will specialize in evaluation and management of oil and gas properties.

Contracts . . . It has been announced that a one-year contract to assist the U. S. Air Force in supervision and inspection of construction on Third Air Force Installations in England has been awarded to the architectural-engineering joint venture of **Frank Grad & Sons** of Newark, N. J., and **Seelye Stevenson Value & Knecht** of New York. . . . The **Potomac Electric Power Company** has retained **Stone & Webster Engineering Corporation** to design and construct a 100,000 kw extension to the Potomac River Generating Station in Alexandria, Va., to augment the District of Columbia's existing power supply. The project is scheduled for completion by May, 1957.

With Our Members . . .

GREENSBORO CONFEREES. Pictured, left to right, are: B. O. Vannort, president of the Professional Engineers of North Carolina; Allison C. Neff, NSPE president; and E. E. Hanks, president of the new North Piedmont Chapter of the PENC. The three were among the participants in a recent PENC meeting in Greensboro. (See story below.)

President Neff Addresses P.E.'s At North Carolina Event

Allison C. Neff, president of NSPE was the featured speaker at the banquet of the annual summer meeting of the Professional Engineers of North Carolina, which was held at the Sedgefield Inn near Greensboro, N. C., in mid-August. President Neff talked of the many ways in which engineers can make important contributions in civic affairs.

He listed the attributes of the engineer which qualify him as a leader to serve his community in local and state elective and appointive offices. He also deplored the apathetic attitude of many engineers in neglecting the basic duties of citizenship because "they may feel the sometimes rough give and take of politics is beneath their dignity as professional men." He said, "Our pride must give way to practical common sense and the realization of the need for good men in government even though they must undergo the slurs, the criticisms, and heckling which are a part of American politics."

B. O. Vannort, president of the PENC, presided at the business and professional sessions. He spoke particularly of the need for an increased effort on the part of individual engineers to expand the public relations program of the profession.

The meeting also featured a symposium on civic affairs at which the speakers were James R. Townsend, City Manager of Greensboro, Col. J. Norman Pease of the J. N. Pease Company, consulting engineers of Charlotte, and C. S. Reed, vice president of the Duke Power Company.

A highlight of the meeting was the announcement of the organization of the North Piedmont Chapter of the PENC which will include membership of professional engineers in the Greensboro - High Point - Winston Salem areas of North Carolina. E. E. Hanks of Greensboro is president of the newly formed chapter.

George Rottman, chairman of the Local Arrangements Committee, prepared the program which included a golf tournament for the members and their guests, a bridge tournament for the ladies, and a dance following the Friday evening banquet. Thomas A. Able, Jr., of Greenville, S. C., president of the South Carolina Society of Professional Engineers was a special guest of PENC.

Fairmont Is Scene Of West Va. Meeting

The Fairmont Hotel, Fairmont, West Virginia, was the scene of the 22nd annual convention of the West Virginia Society of Professional Engineers, September 22-24.

A welcoming address was delivered at the first general session of the conference by Charles Jenkins, City Director of Fairmont. NSPE President Allison C. Neff was the featured speaker at a special session on the 23rd; his subject was *Your National Society*. Chester A. Arents, dean of the College of Engineering of West Virginia University, addressed a luncheon meeting on the subject, *The Revolution in Engineering Education*. Other featured speakers were Paul H. Robbins, executive director of the National Society, and Clayton Rand, a well-known editor and author.

Officers of the West Virginia Society alternated in presiding at the various business and professional sessions. An event of special interest was the presentation of the society's "Engineer of the Year" Award to Dr. R. P. Davis, former dean of the College of Engineering at West Virginia U. Paul M. Hutchinson, president of the WVSPE, made the presentation.

The social program for the meeting included the opportunity to attend the football game in Morgantown between West Virginia and the University of Richmond.

W. D. Nickles served as chairman of the General Convention Committee, assisted by Paul M. Hutchinson, John F. Laughlin, Jr., Dr. Alfred D. Longhouse, James R. Meredith, Carl S. Miller, Dr. Leon Z. Seltzer, Thurman A. Stout, and J. T. Van Voorhis.

Officers' Conference In Harrisburg, Pa.

Chapter officers and committee chairmen of the Pennsylvania SPE met at the Harrisburger Hotel in Harrisburg on September 24 to exchange views on the development of chapter programs and professional activities for the coming year. PSPE President C. L. Kreidler presided over the day-long meeting that featured talks by various state society committee chairmen, followed by general discussion of the problems or recommendations they had presented.

Plans for the PSPE's 1956 convention were also discussed during the meeting.

. . . more news on page 39

KIRK & COWIN

Ralph E. Kirk—Percy G. Cowin
Consulting—Appraisals—Reports
Registered Professional Engineers

One-18th Street, SW Birmingham, Alabama
Phone 56-5566

PALMER AND BAKER, INC.

Consulting Engineers — Architects

Surveys, Reports, Design, Supervision, Consultation, Traffic Problems, Tunnels, Bridges, Highways, Airports, Industrial Buildings, Waterfront & Harbor Structures. Complete Soils, Materials & Chemical Laboratories.

Mobile, Ala. **New Orleans, La.**
Harvey, Louisiana

A. W. WILLIAMS INSPECTION CO.

Mobile, Ala.
Established 1921

Inspection—Tests—Analyses
Sampling
Foundation Investigations
Representatives throughout U.S.A.
Member A.C.I.L.

KAISER ENGINEERS

Division of Henry J. Kaiser Company

ENGINEERS — CONTRACTORS

1924 Broadway, Oakland 12, California

SVERDRUP & PARCEL, INC.

Consulting Engineers

Bridges—Structures—Highways
Industrial and Power Plant
Engineering

915 Olive Street, St. Louis 1, Mo.
417 Montgomery St., San Francisco, Calif.

GEORGE V. R. MULLIGAN, P.E.

Management Consultant

Operations Analysis
Manpower Utilization
Management Controls

601-19th Street, N.W. **Washington, D. C.**

SOUTH FLORIDA TEST SERVICE

Testing—Inspection—Research—Engineers

Consultants and specialists in corrosion, weathering and sunlight testing.

4301 N.W. 7th Street **Miami 34, Florida**

Member A. C. I. L.

LAW—BARROW—AGEE LABORATORIES, INC.

Foundation
Investigations
Physical & Chemical Testing

Main Laboratories: Atlanta, Ga.
Charlotte, N. C., Albany, Ga., Tampa, Fla.

MERRITT & WELKER

Engineers

Water Systems **Natural Gas Systems**
Sewer Systems **Streets & Roads**

Marietta, Georgia

ROBERT AND COMPANY ASSOCIATES

Consulting and Designing Engineers

Industrial Plants—Municipal, Highway and Airport Improvements — Power Plants — Water Supply — Sewage and Industrial Waste Disposal — Appraisals — Reports.

Atlanta **Georgia**

C. L. CALKINS

Professional Engineer

Mechanical and Electrical Engineering
Since 1916

Designing and Development of Special Machinery—Research—Reports—Tests
Layouts—Plans and Specifications
Illinois Registration

644 Lorraine Avenue **Waukegan, Illinois**
Telephone MAjestic 3-1090

CONSOER, TOWNSEND and ASSOCIATES

Water Supply, Sewerage, Flood Control and Drainage, Bridges, Express Highways, Paving, Power Plant, Appraisals, Reports, Traffic Studies, Airports Gas & Electric Transmission Lines

351 E. Ohio St., Chicago 11, Illinois
9½ N. Indiana St., Greencastle, Ind.

CRESCENT ENGINEERING COMPANY, INC.

Contracting & Consulting Electrical Engineers

Design, Supervision and Construction
Process Power and Lighting for
Industrial Plants

6455 S. Central Avenue, Chicago 38, Illinois

DeLEUW, CATHER & COMPANY

Consulting Engineers

Transportation, Public Transit and Traffic Problems

Industrial Plants, Grade Separations, Railroads, Subways, Power Plants, Expressways, Tunnels, Municipal Works

150 N. Wacker Drive **79 McAllister St.**
Chicago 6 **San Francisco 2**

FRASER, WEIR & ASSOCIATES, INC.

Industrial Consultants

Controlled Maintenance Installations

20 North Wacker Drive
Chicago 6, Illinois

LOUIS J. LUCAS

Industrial Management Engineer

Production — Sales — Administration

1055 Granville Avenue
Chicago 40, Illinois

PAUL WEIR COMPANY

Mining Engineers and Geologists

Management and Consultation
Design and Construction

20 North Wacker Drive
Chicago 6, Illinois

PAUL BERG

Consulting Engineer

Specializing in Feed Milling and Grain Elevators

Registered Ten States

130½ E. Wayne St. **Phone E-7558**
FORT WAYNE, IND.

WILSON & COMPANY

ENGINEERS

Salina, Kansas
Albuquerque, New Mexico
Denver, Colorado

EUSTIS ENGINEERING COMPANY

FOUNDATION AND SOIL
MECHANICS INVESTIGATIONS
Soil Borings—Laboratory Tests
Foundation Analyses—Reports

3635 Airline Highway
New Orleans 20, La.

WHITMAN, REQUARDT & ASSOCIATES

Engineers — Consultants

Civil—Sanitary—Structural
Mechanical—Electrical
Reports, Plans Supervision, Appraisals

1304 St. Paul Street, Baltimore 2, Maryland

ROGER BARRETT BROSS

Registered Professional Engineer

Special Electric Motors & Drives
Electromagnetic Devices
Design & Development
Testing & Consulting

25 Curtis Road **Natick, Mass.**

FAY, SPOFFORD & THORNDIKE

Engineers

John Ayer — Ralph W. Horne
Bion A. Bowman — William L. Hyland
Carroll A. Farwell — Frank L. Lincoln
Howard J. Williams

Airports, Bridges, Turnpikes
Water Supply, Sewerage, Drainage
Port and Terminal Works
Industrial Building

Boston **New York**

METCALF & EDDY

Engineers

Water, Sewage, Drainage, Refuse and Industrial Wastes Problems

Airfields — Valuations
Laboratory

Statler Building **Boston 16, Mass.**

COMMONWEALTH ASSOCIATES INC.

Consulting and Design Engineers

Power Generation
Electric—Gas—Water Systems
Industrial Planning

252 W. Cortland St. **Jackson, Michigan**

EUGENE K. FALLS

Consulting Engineer

PRESSURE RELIEVING SYSTEMS
Process Industries, Utilities
Manufacturing, Commercial, Residential
SAFETY VALVES • RELIEF VALVES
Consultation, Development
Design of Test Facilities,
Performance Tests, Modernization,
Special Applications

4445 North River Road, Port Huron, Mich.

ORRIN E. FENN

CONSULTING — DESIGN

Complete Engineering Service

Air Pollution—Fume and Dust Control
Finishing Systems for Painting,
Plating and Porcelain Enamel
Industrial Ovens and Dryers

38128 Lake Shore Dr. **Mt. Clemens, Mich.**

THE HINCHMAN CORPORATION
Consulting Engineers
CORROSION CONTROL—Surveys, Reports, Design, Specifications, Evaluation
UNDERGROUND UTILITIES — Location, Mapping, leakage surveys, electrical grounding systems
HOLLOW PILING—Directional Surveys by electronics
Francis Palms Building Detroit 1, Mich

BETTENBURG, TOWNSEND & STOLTE
Registered Professional Engineers
A complete professional service
1437 Marshall Ave., St. Paul 4, Minn.
Tel.: NEstor 6191

BLACK & VEATCH
Consulting Engineers
Water—Sewage—Electricity—Industry
Reports, Design
Supervision of Construction
Investigations, Valuation and Rates
4706 Broadway, Kansas City 2, Mo.

BURNS & McDONNELL
Consulting and Designing Engineers
P.O. Box 7088 Kansas City, Mo.
Telephone DElmar 4375

A. C. KIRKWOOD & ASSOCIATES
ENGINEERS
CONSULTANTS
7800 The Paseo
Kansas City 10, Mo.

A. L. MUNSON & ASSOCIATES
CONSULTING ENGINEERS
—MECHANICAL—
Specialists in:
AIR CONDITIONING
Heating, Cooling, Refrigeration
20 South Gore Avenue
St. Louis 19, Missouri

J. Z. JIZBA
Civil Engineer & Architect
Bridges, Buildings, Drainage, Highways
Design, Survey, Supervision
5417 Ogden Street Omaha 4, Nebraska

FRANK E. HARLEY AND ASSOCIATES
Water Works, Sewage, Municipal
Highways
Harley Building
360 Godwin Avenue Wyckoff, N. J.

UNITED STATES TESTING COMPANY, INC.
Engineering Testing and Inspection
Development—Research—Consulting
Soils • Concrete • Steel • Welding
Pipe • Brick • Tile
Main Laboratories: Hoboken, New Jersey
Boston, Denver, Chicago, Dallas, Memphis, New York, Wilmington, Philadelphia, Providence, Los Angeles

BROWN & BLAUVELT
Industrial Plants, Bridges, Dams, Airports, Expressways, Parkways, Highways, Preliminary Reports, Engineering Design, Construction Supervision, Material Controls and Testing, Municipal Engineering Services, Tax Maps, Surveying
468 Fourth Avenue New York 16, N. Y.

FOSTER & CAFARELLI
Engineers
Port Development, Shipyards, Drydocks, Power Plants, Distribution Systems, Industrial Plants, Commercial Buildings. Surveys, Reports, Estimates, Design, Supervision, Consultation.
44 Whitehall Street, New York 4, New York

HARDESTY & HANOVER
Consulting Engineers
Bridges—Long Spans of All Types
Movable—Lift, Bascule and Swing
Hanover Skew Bascule, Steel and Concrete Spans
Grade Crossing Eliminations
Expressways and Thruways
Other Structures, Foundations
Supervision, Reports, Appraisals
101 Park Avenue, New York 17, N. Y.

Restricted to Registered Professional Engineers . . . Directory Continued on Next Page

Northeast Texas P.E.'s Report Activities

A late-August picnic sponsored by the Ladies' Auxiliary to the Northeast Chapter of the Texas Society of Professional Engineers drew a large attendance from among the P.E.'s in the Paris, Greenville, Bonham, and Denison area, according to a recent chapter report. Mrs. L. D. Cabiness was chairman of the committee that arranged the outing. The event was held at the Gordon Country Club near Paris, Texas, and before the social festivities got under way a business meeting was called to order to hear the latest news of several important chapter projects.

President J. R. Anthony, Jr., presided at the business session during which a report was made concerning chapter action in bringing the information about professional registration to young graduate engineers. Members of the chapter had met with a small group of young engineers, all employees of an industrial plant within the chapter area, at the request of the latter in order to explain the registration procedure and the philosophy that lies behind it.

A second report was received from a special committee that had done follow-up work following the appearance of NSPE President Neff's recent letter to the U. S. newspaper publishers concerning the low percentage of students studying mathematics and science in the Nation's secondary schools. The committee had been responsible for several news items and feature articles which appeared in the daily papers in Denison, Bonham, and Greenville.

New York Chapter Elects Elvove

Elias Elvove of Yonkers, N. Y., a partner in the Manhattan consulting engineering firm of McConnaughy & Elvove, has been elected president of the New York Chapter of the NYSSPE, according to a recent announcement. Mr. Elvove is a graduate of both the University of Maryland and the University of Illinois, having received his master's degree in electrical engineering from the latter.

Other newly-elected officers of the New York Chapter are: Theodore J. Kauffeld, Montclair, N. J., first vice president; Samuel Carr, Cedarhurst, Long Island, second vice president; Felix Viola, Staten Island, secretary; and John Kaspari, Mount Vernon, N. Y., financial secretary.

Minn. Civil Officials Study Ryan Paper

Engineering officials of Minneapolis and St. Paul and the Minnesota Highway Department have been studying with interest a special paper, entitled "The Minnesota Overpass," which was prepared by Professor James J. Ryan of the Mechanical Engineering Department of the University of Minnesota. Professor Ryan, who is a past president of the Minnesota Society of Professional Engineers, makes recommendation in the paper for a specific overpass in Minneapolis as an aid both in overcoming day by day traffic congestion and in offering optimum traffic conditions for civil defense evacuation of the city.

Because such an overpass as Professor Ryan suggests can be effective in many other locations and other cities, considerable interest has been aroused by the paper among local and national civil defense officials as well as among engineers.

The specific overpass plan offered in the Ryan report was developed as the direct result of a problem assigned to a class of the professor's at the University.

. . . more news on page 41.

FREDERIC R. HARRIS, INC.
Consulting Engineers

Harbors, Piers & Bulkheads, Drydocks, Foundations, Soil Mechanics, Sanitary & Industrial Waste Disposal, Airports, Highways, Bridges

27 William Street — New York 5, N. Y.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
Consulting Engineers

Bridges, Structures, Foundations
Express Highways
Administrative Services

1805 Grand Avenue — Kansas City 8, Mo.
55 Liberty Street — New York 5, N. Y.

MADIGAN-HYLAND
Consulting Engineers

28-04 41st Avenue

Long Island City, New York

JAMES P. O'DONNELL
Engineers

39 Broadway — New York 6, N. Y.
Bowie Building — Beaumont, Texas

PARSONS, BRINCKERHOFF, HALL & MACDONALD
Engineers

Bridges, Highways, Tunnels, Airports, Subways, Harbor Works, Dams, Canals, Traffic, Parking and Transportation Reports, Power, Industrial Buildings, Housing, Sewerage and Water Supply.

51 Broadway, New York 6, N. Y.

SEELYE STEVENSON VALUE & KNECHT
Consulting Engineers
Richard E. Dougherty, Consultant

Airports, Highways, Bridges, Dams, Water Supply, Sanitation, Tunnels, Industrial Plants, Concrete, Steel, Industrial Waste Disposal, Foundations, Soil Studies. Civil—Mechanical—Electrical

101 Park Avenue — New York 17, N. Y.

SINGSTAD & BAILLIE
Consulting Engineers

Ole Singstad — David G. Baillie, Jr.

Tunnels, Subways, Highways
Foundations, Parking Garages
Investigations, Reports, Design
Specifications, Supervision

24 State St. — New York 4, N. Y.

D. B. STEINMAN
Consulting Engineer

HIGHWAYS — BRIDGES — STRUCTURES

Design — Construction — Investigations
Strengthening — Reports — Advisory Service

117 Liberty Street — New York 6, N. Y.

SYSKA & HENNESSY, INC.
Engineers

Design, Reports, Consultation
Power Plant, Disposal Plant, Water Systems

NEW YORK, N. Y.

TIPPETTS-ABBETT McCARTHY-STRATTON
Engineers

Ports, Harbors, Flood Control, Irrigation Power, Dams, Bridges, Tunnels, Highways Subways, Airports, Traffic, Foundations Water Supply, Sewerage, Reports, Design Supervision, Consultation.

62 West 47th Street — New York City

LEONARD M. TODD
Consulting Engineer

CHEMICAL AND INDUSTRIAL PLANTS
PROCESS SURVEYS PATENT REPORTS

24 Fifth Avenue — New York 11, N. Y.
GRamercy 3-6400

New York — Washington — St. Louis — Oklahoma City

ADACHE & CASE, ENGINEERS
The Arcade — Cleveland 14, Ohio

Aircraft Turbo-Jet Laboratories
Minus 100° to Plus 1000°
400° High Temperature Hot Water District Heating

ELMER S. BARRETT ASSOCIATES
CONSULTING ENGINEERS

Surveys—Design—Inspection

Highways — Municipal
Bridges — Reports

Transmission Lines

249 S. Paint St. — Chillicothe, Ohio
Phone: 34600

E. D. BARSTOW & ASSOCIATES
E. D. Barstow—T. A. Gilliam

Water Supply, Sewerage,
Highways, Structures, Industrial

163 N. Union Street — Akron 4, Ohio

GEORGE W. BRANDT, ENGINEER
Consulting • Design • Mechanical • Development • Fabrication

Box 161 — West Milton, Ohio

GUSTAVE M. GOLDSMITH
Consulting Engineer

General Structures — Plant Layout

Design—Investigation—Quantity Surveys

1734 Bella Vista — Cincinnati 37, Ohio

EMMET J. McDONALD
CIVIL ENGINEER

HIGHWAYS, MUNICIPAL, SURVEYS

327 Rhodes Avenue — Akron 2, Ohio

THE H. C. NUTTING COMPANY
Engineers and Chemists

Foundation Investigations
Core Drilling
Water and Waste Surveys
Complete Testing Service

4120 Airport Road, Cincinnati 26, Ohio
2145 N. W. 2nd Ave., Miami 37, Florida

JOHN OSTBORG
Engineer Designer

Diesel Engine Design Consultant
Mechanical Engineering & Design Service

31 E. High Street — Springfield, Ohio

TOLEDO TESTING LABORATORY
Engineers and Chemists

Concrete — Soils — Asphalt
Inspection — Tests — Supervision
Consultation — Specifications and
Investigation of
Engineering Works and Materials

1810 North 12th St. — Toledo 2, Ohio

OKLAHOMA TESTING LABORATORIES
Registered Engineers—Chemists

Oklahoma City, Okla.

Materials Testing and Inspection

Member A. C. I. L.

C. A. Lashbrook — Owner-Director
M. A. Witte — Chief Engineer

ALBRIGHT & FRIEL INC.
Consulting Engineers

Water, Sewage, Industrial Wastes and Incineration Problems
City Planning, Highways, Bridges and Airports
Dams, Flood Control, Industrial Buildings
Investigations, Reports, Appraisals and Rates
Laboratory For Chemical & Bacteriological Analyses
Complete Service on Design and Supervision of Construction

Three Penn Center Plaza, Phila. 2, Pa.

ARK ENGINEERING COMPANY
Consulting Electronic Engineering

Radio Interference Measurements and Control
F.C.C. Equipment Certification
Electronic Development—Technical Writing

431 W. Tabor Road
Philadelphia 20, Pennsylvania
Phone: LIvingston 8-1545

MICHAEL BAKER, JR., INC.
Consulting Engineers

Highways, Airports, Waterworks, Sewers, Sewage Treatment, City Planning, Surveys, Photogrammetric Mapping

Baker Building—Rochester, Penna.
Branch Offices
Harrisburg, Pa. Jackson, Miss.
College Park, Maryland

CAPITOL ENGINEERING CORPORATION
Engineers—Constructors—Management

Design and Surveys — Roads and Streets
Sewer Systems — Water Works
Planning — Airports
Bridges — Turnpikes — Dams

Executive Offices: Dillsburg, Pennsylvania
Washington, D. C. — Pittsburgh, Pa.
Dallas, Texas — Paris, France

FRAZIER-SIMPLEX, INC.
CONTRACTING & CONSULTING ENGINEERS

Furnace Engineering for the Glass and Steel Industries

436 East Beau Street, WASHINGTON, PA
U. S. A.

GANNETT FLEMING CORDDRY & CARPENTER, INC.
Engineers

Water, Sewage, Roads, Turnpikes
Bridges, Airports, Traffic, Appraisals

HARRISBURG, PA.

Philadelphia, Pa. — Daytona Beach, Fla.
Pittsburgh, Pa. — Medellin, Columbia, S.A.

DIRECTORY

Alphabetized by States . . .
Pennsylvania-W. Virginia

GREEN ENGINEERING COMPANY
Consulting Engineers
Highways, Bridges, Buildings, Industrial Plants
Pittsburgh, Pa.
Philadelphia, Pa. — Baltimore, Md.
Boston, Mass. — Washington, D. C.
Chicago, Ill. — Miami, Florida

HALL LABORATORIES, INC.
Consultants on Industrial Water Problems
Boiler Water Conditioning, Cooling Water Treatment, Process and Waste Water Engineering Service
P. O. Box 1346 — Pittsburgh 30, Pa.
(323 Fourth Ave.)

THE KULJIAN CORPORATION
Engineers • Constructors • Consultants
POWER PLANTS
(Steam, Hydro, Diesel)
Oil Refineries, Pipe Lines • Chemical Plants • Textile Plants • Breweries, Food Processing Plants • Airports, Hangars Army, Navy Installations
1200 No. Broad St., Philadelphia 21, Pa.

LAWRIE & GREEN & ASSOCIATES
Architectural and Engineering Offices
321 N. Front Street
Harrisburg, Pennsylvania
Ritchie Lawrie, Jr., P.E., Consulting Engineer

MODJESKI AND MASTERS
Consulting Engineers
G. H. Randall — F. M. Masters — J. R. Giese
C. W. Hanson — H. J. Engel
Design and Supervision of Construction
Inspection and Reports
Bridges, Structures and Foundations
State St. Bldg., Harrisburg, Pa. — New Orleans, La. — Philadelphia, Pa.

CYRUS WM. RICE & CO., INC.
Consulting Chemical Engineers
Industrial Water and Waste
16 Noble Avenue, Pittsburgh 5, Penna.

EMERSON VENABLE
Chemist and Chemical Engineer
Chemical Analysis
Research — Development
Trouble Shooting
6111 Fifth Ave., Pittsburgh 32, Pa.

ENGINEERS TESTING LABORATORY, INC.
FOUNDATION AND SOIL MECHANICS INVESTIGATIONS
Soil Borings — Laboratory Tests
Foundation Analyses — Reports
3313 Main Street — Houston, Texas

FORREST and COTTON
Consulting Engineers
Regional Water Supplies
Water and Sewage Works
Industrial Development
Airports — Dams
Appraisals — Reports
803 Praetorian Building — Dallas 1, Texas

FREESE & NICHOLS
Consulting Engineers
407-410 Danciger Bldg.
Fort Worth 2, Texas

LOCKWOOD & ANDREWS
Consulting Engineers
Water Works, Sewerage & Sewage Disposal, Public Works, Structures, Earthworks, Mechanical & Electrical.
Reports—Design—Supervision
Surveys—Valuations
Corpus Christi—Houston—Victoria, Texas

HARRY L. TOOKER & ASSOCIATES
Architectural & Structural Engineers
Pasadena Oaks Professional Building
Pasadena, Texas

WILTON SMITH WHIPP
Civil Engineer and Land Surveyor
3214 West Broadway — Hopewell, Virginia
Phone: 2019

HARRY OTIS WRIGHT, JR.
Civil Engineer & Land Surveyor
THE WRIGHT ENGINEERS
Airports, Highways, Sewerage, Waterworks, Sewage Treatment, Land Planning, Surveys, Mapping
Phone: CRescent 3-2882
Post Office Building, Fairfax, Virginia.

FERGUSON-GATES ENGINEERING CO.
Registered Professional Civil and Mining Engineers
Coal Property Reports — Valuation — Development — Plant Design — Ventilation — Dust Surveys
Allen Building — P. O. Box 672
Telephone 5721 — Beckley, W. Va.

. . . Supplemental Services . . .

APPLIED PSYCHOLOGY CORPORATION
Specialists in man-machine problems.
Robert B. Sleight, PhD, President
515 4th St. N.W., Washington 1, D. C.

A PATENTED NON-METALLIC CONDUIT SYSTEM
For Conveying Hot or Cold Liquids, Vapors
VERSATILE—CORROSION PROOF—RELIABLE
Write
Water-Tight Underground Conduit
Engineers & Fabricators
P.O. Box 12211, Houston 17, Texas — P.O. Box 2181, Atlanta 1, Ga.

BUILDERS ESTIMATING SERVICE
COST ESTIMATES
QUANTITY SURVEYS
CONSTRUCTION ANALYSIS
MATERIAL PURCHASE LISTS
140 Nassau Street, New York 38, N. Y. — Telephone COrtland 7-6322

KENNEDY-RIEGGER DRILLING COMPANY, INC.
Fred W. Riegger, P.E., President, Assoc. Mem. A.S.C.E.
Licensed Professional Engineers
Core Drilling Contractors
Diamond Drill and Test Borings
KIngsbridge 9-3458
5418 Post Road, New York 71, N. Y.

MANU-MINE RESEARCH & DEVELOPMENT CO.
Soil Solidification
Geological Engineering
Chemical Research
P. O. Box 167
Reading, Pennsylvania

PROFESSIONAL DIRECTORY RATES

12 mos., *paid in advance*	$ 96.00
12 mos., *billed monthly @ $9.00 ea.*	108.00
6 mos., *paid in advance*	54.00
6 mos., *billed monthly @ $10.00 ea.*	60.00

• *Consult this Directory for Qualified Specialists* •

Wisconsin Conference Held at Lake Delton

The Dell View Hotel, Lake Delton, Wisconsin, was the scene of the eighth Summer Conference of the Wisconsin Society of Professional Engineers on September 16-18. Sports and social activities were interspersed with the professional meetings of the WSPE chapter presidents and state committees. Also, there was a general business meeting at which WSPE President A. Owen Ayres presided.

Members of the Southwest Chapter were hosts for the event. Harold L. Lautz served as chairman of the committee in charge of local arrangements, assisted by Paul J. Grogan, Donald B. Johnson, Page A. Johnson, and Jack H. Maxfield. Karl O. Werwath is chairman of the state program committee, which gave general direction to the planning.

A special committee in charge of the ladies' program was composed of the wives of the local engineers.

. . . more news on page 42.

TEXAS CEREMONY.—A. M. Muldrow, left, Texas Secretary of State, is shown swearing in R. M. Dixon as the new chairman of the Texas State Board of Water Engineers in a special ceremony in Governor Shivers' office. Later Mr. Dixon was honored by prominent engineers and public officials at a testimonial luncheon. (Full story appears at the left.)

R. M. Dixon Heads Texas Water Board

R. M. Dixon, president of the Dallas Chapter of the Texas SPE and vice-chairman of the state society's Water Education Committee, has recently been sworn in as chairman of the three-man Texas Board of Water Engineers. Mr. Dixon's appointment to the board, which was made by Governor Allan Shivers, is a direct result of a water conservation program promoted by the Texas Society.

Early this year, after intensive study of the State's water problem, the Society sponsored the publication of a book entitled *Water* (see AMERICAN ENGINEER, February, 1955), detailing the Texan situation in relation to the water resources problem. The book was given wide distribution and was very well received by municipal officials, industrial and civic organizations, and members of both the State and national legislatures. The development of a comprehensive water program was adopted as a major goal by many of the State's legislative candidates; and the Texas Legislature passed a number of important bills to implement such a program, including a measure to triple the operating appropriation for the State Board of Water Engineers.

Mr. Dixon, who has most recently been executive director of the Municipal Contractors' Association, was one of three top-flight engineers in the water conservation field whose names were suggested to the Governor by the Texas Society as candidates to fill the vacancy left by the resignation of Andrew P. Rollins. His appointment was made in July for the remainder of the unexpired term of Mr. Rollins and for a new six-year term which began on August 19.

Arizona Central Chapter Elects, Plans Programs

A meeting of the new officers and committee chairmen of the Central Chapter of the Arizona Society of Professional Engineers was held recently in the Conference Room of the Phoenix Public Library. The purpose of the meeting was to initiate program plans for the chapter's forthcoming meetings and other professional activities and projects of the members.

The newly-elected officers of the group are: John A. Carollo, president; Remo Raviola and Dwight L. Busby, vice presidents; Merrill J. Lemnah, secretary-treasurer; and Americo Lazzari, director. Lloyd Martin is the immediate past president.

New Central Chapter committee chairmen appointed for the current year are: Oliver Briggs, Public Relations; Americo Lazzari, Registration for Young Engineers and Education; Frank Bromley, Publications; K. K. King, Inter-Society Relations; Lloyd Martin, Membership; Walter Biddle, Legislative; John Stephens, Professional Practices and Ethics; Harold Hudson, Budget; Edwin P. Boothroyd, Bylaws; John Stephens, Chamber of Commerce Liaison; Remo Raviola, Programs; and Stephen M. Chalmers, Dinners and Banquets.

Death Claims Prominent NSPE Men

News of the passing of several prominent members of the National Society has recently been reported to the Washington headquarters office.

The death of H. J. Fixmer, a former NSPE vice president, occurred in mid-August. Mr. Fixmer, who also had been a president of the Illinois Society of Professional Engineers, was an engineer for the City of Chicago until his retirement in June, 1955. He served as vice president of the National Society from December 22, 1936, until June 30, 1937, filling the unexpired term of H. E. Babbitt who had resigned from the office.

The second well-known member to succumb was Charles A. Emerson of East Orange, New Jersey, a well-known consulting engineer and a partner in the firm of Havens and Emerson of New York City and Cleveland. Mr. Emerson, who was a native of Beloit, Wisconsin and a graduate of Beloit College and of M.I.T., was a licensed P.E. in six states and belonged to many professional and technical societies in addition to NSPE. At the local level he was affiliated with the Essex County Chapter of the New Jersey SPE.

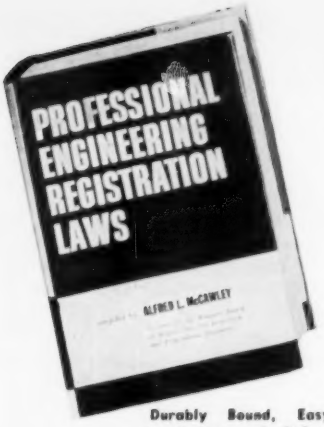
Also recently-deceased is F. N. Holmquist of Phoenix, Arizona, a prominent consultant who had once served as the first full-time city engineer of that Arizona city. Mr. Holmquist, who was a native of Weldon, Illinois, and a graduate of the University of Illinois, came to Phoenix early in his career. He has been regarded as the dean of the latter city's engineers for many years. He is survived by his widow and four children.

Social Event Starts Fall Season

On September 20 the Central New York Chapter of the New York State SPE sponsored a clambake, which it plans to make an annual event, as the "kick-off" for fall-winter season. The event was co-sponsored by the Central New York Society of Land Surveyors, and guests included prospective members of both organizations.

The program committee for the clambake included John H. Christiana, Robert P. Lett, Seymour Ribyat, Bernard C. Smith, and Robert W. Oertel.

The Central New York Chapter takes its membership among engineers in the Syracuse area.



Durably Bound, Easy-to-read type. A Reference Shelf Buy at $8.75.

A Compendium of Registration Laws for Professional Engineers in the 48 States, Alaska, Hawaii, Puerto Rico, and the District of Columbia . . .

Here is a volume that belongs on the shelf of every professional engineer's reference library or in the hands of the student engineer. Compiled by Alfred L. McCawley, a recognized authority in the field of professional registration, the book presents, state by state, the exact legal requirements that must be met for professional practice. Laws are cited, and much attention is given to details regarding temporary permits, fees and bonds, educational requirements, and many other factors.

ORDER YOURS NOW FROM:

A. L. McCAWLEY
Trustee, Publications Fund
Box 474
Jefferson City, Missouri

(CHECKS MUST BE MADE OUT TO ABOVE)

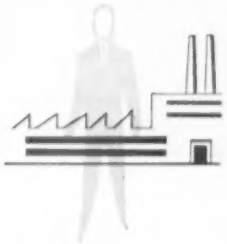
DOES YOUR FIRM REALLY TRAIN ITS ENGINEERS?

American industry is rapidly becoming a post-graduate school for engineer training. Do you have the facts about this vital development?

"HOW TO TRAIN ENGINEERS IN INDUSTRY" will give you these facts. This is the fourth in a series of executive research survey reports published by the Professional Engineers Conference Board for Industry. It is a broad-gauge report designed to bring nation-wide engineer training problems before you in the clearest possible focus. This survey will show you how your own firm shapes up in the engineer training picture. It has proved an "eye opener" for training directors who thought they knew all the answers.

Prices: $1.00 to NSPE members.
$2.00 to non-members.

"A PROFESSIONAL LOOK AT THE ENGINEER IN INDUSTRY"



Appearing after more than a year of intensive research and study, this book is a major publication in the engineering-industry field. Brought together in compact form are a wealth of pertinent facts about the background and present situation bearing on the future professional development of engineers employed in all types of industry, and the related effects on all other professional engineers. 128 pages • 6 illustrative charts • 11 tables of economic data • fully documented by more than 250 references • bibliography and index.

Prices: $1.50 to NSPE members. $3.00 to non-members. Orders of over 25 copies: $1.00 per copy to NSPE members, $2.00 per copy to non-members.

Note These Chapter Headings

- The Impact of the Wagner Act
- The Medicine of Taft-Hartley
- Taft-Hartley in Action
- The Causes of Dissatisfaction
- The Influence of Unions
- Professionalism Versus Unionism

READ THE PRINTED RECORD OF NSPE's PHILADELPHIA ENGINEER-in-INDUSTRY CONFERENCE

Now you can order a copy of the entire proceedings—more than 50 pages—of one of the most important professional conferences in recent years. This is the all-day conference that featured 11 top experts in their fields—industrialists, educators, engineers—in a stimulating, and sometimes highly critical, discussion of the problems of the engineer-in-industry.

If you are a professional engineer you will surely benefit from the talks given by these outstanding engineering figures. Included is the printed record of a 3-hour-long question and answer period.

Prices: $2.00 per copy to NSPE members.
$4.00 per copy to non-members.

Mail This Coupon Today

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS
1121 15th St., N.W.
Washington 5, D. C.

Yes, I am enclosing check or money order for $....., for which please rush the following to me:

..... copies of "How to Train Engineers in Industry" at .....

..... copies of "A Professional Look" at .....

..... NSPE Engineer-in-Industry Conference at .....

NAME .....

ADDRESS .....

.....

Mitchell

(*Continued from page* 14)

partment of Labor strongly endorses this recommendation and will continue to assist vocational guidance activities in every way it can.

To fully realize our skill potentials, sufficient numbers of persons with the necessary basic abilities must be induced to seek training for skilled jobs. The power of economic incentives is strong. Over the past half century, the average differential between the wages of the skilled and the unskilled has been drastically cut. Fears have been expressed that this development may restrict the number of workers willing to take the time for training in skilled work. Of course, the size of the pay check is not the only motivating force behind a worker's desire to become skilled. Workers are influenced by such things as prestige, working conditions, job satisfaction, the degree of independent action possible, and the pattern of supervision. However, the money a worker can expect is one of the most important motives behind his decision to enter the skilled trades. Many workers may be reluctant to submit themselves to a long period of training, if with relatively little training they can earn approximately the same wages in a job requiring less skill.

Employers might do well, therefore, to take a new look at their wage-rate differentials. Are employees given an adequate incentive to enter the skilled trades? Unless there is a sufficient reward for the sacrifice of time and energy that is required of workers to obtain a skill, many men and women are going to by-pass training programs.

Another aspect of the skilled worker problem which deserves the thoughtful attention of industry, labor and government is the problem of discrimination in employment. The National Manpower Council also underlined this problem in its report: "Large segments of the American population," the report said, "are denied access to work and training in many skilled occupations because of widespread prejudices against racial and ethnic groups."

A large number of men and women who are available to enter the skilled trades are Negroes and members of other minority groups. Negroes, alone, comprise one-tenth of the U. S. population, yet very few are skilled. Many Negroes are barred outright from entering apprenticeship programs. Others are barred employment opportunities in plants where through experience and informal training, they might learn a skill. Still others refuse to apply for admittance into apprenticeship programs, vocational schools and other forms of training programs, because they realize that even if they are accepted and complete the training, they will, nevertheless, have a difficult time finding a job.

Although it is true that we have made a good deal of progress in this area in the last few years, our efforts must only be regarded as a beginning. Until each man qualified to enter training programs is given the opportunity to do so, we must consider our job not done. President Eisenhower's Committee on Government Contracts, of which I am Vice Chairman, has broken much new ground. We must pursue these efforts, especially in those areas where discriminatory practices exist, and not cease until we have eliminated this shameless and senseless waste.

There are also two other areas which deserve more than just a little exploration. The first deals with women in the labor force, and the second deals with the so-called "older worker," or more specifically, workers forty-five years of age and older. Within these two groups, rests a potential of skilled workers which has already proved its value to the Nation in times of national crisis. Unfortunately, when the economy swings back off an emergency basis of operation, job barriers are created, most of them artificial, which force many older workers and women out of the labor force.

Although women account for a high percentage of medical technicians and many work in the skilled service trades, the barriers to the training and employment of women found in many sectors of the American economy are particularly significant in the case of skilled work. This is sometimes justified on the ground that many women leave to get married and raise a family without a significant period of productive work after their employers have made a training investment in them. However, discrimination against women seems to be primarily a reflection of widespread social prejudices.

It must be remembered that women seek employment for the same reason that men do, that is, because of economic necessity. At the present time, approximately one-third of our labor force is composed of women workers. Although they have proved their worth in the factories during the last war, relatively few women today are offered the chance to prepare for a skilled trade. This is so even in areas where there is a shortage of skilled workers. This discrimination should be abolished. Those women who need to work should be given the opportunity now to enter the skilled trades.

The problem of the older worker is even more serious, primarily because workers forty-five years of age and older in America are increasing at a far more rapid rate than the population as a whole. Since 1900 the population of the United States has doubled; the number of people sixty-five and over has quadrupled; and the number forty-five and over has tripled. The people forty-five years of age and older constitute about 29 per cent of the total population, contrasted with 18 per cent in 1900. By 1975, it is expected that this group will constitute one-half of the population over twenty years of age.

Industry must realize that the forty-year-old man of today has approximately 25 years of productive labor ahead of him. Moreover, his experience is often a helpful "cushion" to the newcomer working with him. For the most part, industry still bases its employment practices on an obsolete life-expectancy rate. Many industrialists either do not realize or do not want to realize that the forty to forty-five-year-old man still has his most mature years to give to a firm. I believe that what is needed is a redefinition of the word "old."

If we block the employment and advancement of the increasing army of workers over forty years of age, we will be guilty of wasting one of the Nation's most valuable sources of mature, skilled manpower. Industry can do its part in helping to eradicate this problem by adopting employment policies which specify that hiring will be based on ability and experience, regardless of age.

Furthermore, we note from time to time that engineers who have reached retirement age give up their top jobs—chief engineer, vice president for manufacturing, director of research, or whatever the title and attendant responsibilities may have been—but while "retiring" in a sense, they do not leave the industry completely. They take on part time responsibilities at lower salaries. Or they become "consultants" ready to assist the industry with specific problems in areas where they are particularly competent. Perhaps as we advance farther along the paths of technological development and the need for support-

(*Continued on page* 46)

...NEW LITERATURE...

To help the offering firms determine which literature you require, when requesting an item, be sure to list all specifications shown . . . and say you saw it in the AMERICAN ENGINEER.

ROLLER BEARINGS — While featuring the new SCM line of ball bearing pillow blocks, and flange cartridge mounts, this 52-page bulletin contains up-to-date technical information and list prices on the complete line of Dodge SC ball and Dodge-Timken roller bearings. Tabular data includes engineering drawings, dimensions, shaft sizes, weights, radial load ratings and list prices. Throughout the book are product illustrations, including cutaway views showing inner construction. Typical applications of products are shown through installation photos. Obtain from Dodge Manufacturing Corporation, Mishawaka, Indiana.

—AE—

CONVEYOR BELTING — A wall chart on the proper selection and maintenance of conveyor belting is offered to conveyor users by Hewitt-Robins, Inc. The chart, measuring 23 in. x 33 in., contains 12 practical maintenance tips for getting more life out of belts. It deals with storage of belts, correct design of loading chutes, use of automatic switches, lubrication, inspection, and other important aspects of maintenance. The chart also lists the types of belt recommended for various uses, such as mining, metal processing, food processing, chemical and coal handling in public utility plants. Request from Hewitt-Robins, Incorporated, Stamford, Connecticutt.

—AE—

OIL FILTERS — Engine life depends in a large measure on effective oil filters to keep harmful abrasives away from vital parts. In "Filter Research, How and Why . . . ," a new booklet published recently by Caterpillar Tractor Co., the story behind the development of effective oil filters is told. This eight-page booklet starts at the Caterpillar test stands, carrying through testing in engines in the laboratory and the field to the final design resulting from conclusions. Copies of this booklet, form DE583, may be obtained from Caterpillar Tractor Co., Peoria, Ill. Also available in French, Spanish and Portuguese.

—AE—

TIMER—A new brochure describes the Time Recorder + Totalizer including new features for timing, counting and totaling the output on all types of production equipment. Chronologically marked tape continuously passes through the instrument recording "on" and "off" period. Brochure, plus samples of chart-roll tapes in various speeds and styles, available from Heat-Timer Corporation, 657 Broadway, New York 12, N. Y.

—AE—

WATER TANKS — Water Tank Maintenance, Inspection, Survey, Repairs, Painting. Complete reviews of dangers of water tank neglect. Free from Pittsburgh Tank and Tower Company, Pittsburg, Kansas.

MEASURING INSTRUMENTS — The proximity meter, a precision electronic instrument that measures without touching the specimen, is described in a new 28-page booklet offered free by the manufacturer, Fielden Instrument Division of Robertshaw-Fulton Controls Company. Of outstanding flexibility, the instrument can detect a change in temperature of one thousandth of one degree centigrade, or variations as minute as one millionth of an inch. Also described in the booklet are applications of the proximity meter as a non-contacting micrometer (internal and external); concentricity gauge; surface finish gauge (internal and external); strain gauge; torque meter; vibration meter; automatic weighing; breaking strain gauge; paint or insulation thickness gauge; micro thermometer pressure gauge; and moisture content or product composition by means of dielectric measurement. Copies may be obtained from Fielden Instrument Division, Robertshaw-Fulton Controls Company, 2920 North Fourth Street, Philadelphia 33.

—AE—

NUCLEAR RESEARCH — The G-E Atomic Power Equipment Department has announced a new bulletin showing complete nuclear research reactor systems the company can supply as a single source. The bulletin, designated GEA-6326, in eight pages, lists and pictures various reactors and components. It also explains how G-E research reactors can be used in industry, education and research. Available from the General Electric Apparatus Sales Division, Schenectady 5, New York.

—AE—

SEWAGE TREATMENT—Precision Scientific Company has published "Bulletin 240" as a reference manual for sanitary and public works engineers, chemists, and others interested in the proper disposal of sewage and industrial wastes. The 8-page bulletin contains a complete listing of apparatus used for the testing and control of sewage effluent by American Public Health Association methods. Also included is a listing of the apparatus available from this manufacturer. "Bulletin 240" will be sent on request to Precision Scientific Company, 3737 W. Cortland Street, Chicago 47, Illinois.

—AE—

MECHANICAL JOINTS—A new 32-page booklet entitled "Warren-Spun Mechanical Joint Pipe and Fittings" has been published by Warren Foundry & Pipe Corp. The booklet provides the detailed method of installation, standard dimensions, thicknesses and weights and a table of Standard Sizes, Classes, Thicknesses and Weights of Warren-Spun Mechanical Joint Pipe available from the company's Everett, Massachusetts, plant. Copy of this booklet will be sent free upon request. Warren Foundry & Pipe Corporation, 55 Liberty Street, New York 5, N. Y.

GAS TURBINES — An unclassified report on G-E's gas turbine progress in small aircraft engines is available in a brochure from the General Electric Company, Schenectady 5, N. Y. Designated GED-2600, the 20 page, two-color publication traces the development of aircraft gas turbines over the past 40 years and describes how experience gained over this period is being focused on the development of lighter, more efficient small aircraft engines. Additionally the subject of gas turbine helicopters and what they promise in the way of performance superiority, favorable operation, longer life, and lower operating costs is discussed.

—AE—

CONVEYORS — Lamson Corporation announces the release of a new conveyor catalog. It is a facts book to be used for laying out a conveyor system. Contains a general description of the uses and applications of the various components. There is included a method of analyzing loads as to weight distributions and grades, followed by a brief description and easy to read charts of the "when and where" to use various types of wheel and roller gravity, belt and live roll conveyors. Each of the more complicated units, such as the motor drives, powered sections for inclines and declines, horizontal and vertical curves and belt tightening units, are individually illustrated and described as to their application. There is a section with simple charts for figuring conveyor lengths and load friction losses for inclines. A method of determining power requirements is illustrated with sketches of several typical installations. This catalog is written so that the description and illustrations are slanted toward "when to use" the units rather than "what they are." Request from Lamson Corporation, Syracuse 1, New York.

—AE—

WIRE ROPE—"How Edwards Wire Rope is Made" is the title of a new 28-page illustrated booklet issued by E. H. Edwards Co. The booklet describes and illustrates the various steps involved in the manufacture of wire rope. These include heat treating, cleaning, wire drawing, reheating, recleaning, final drawing, galvanizing, testing, tagging, storage, spooling, stranding and closing. The booklet presents a detailed description of the development of "endless" wire of uniform structure into the finished wire-rope. Obtain by writing E. H. Edwards Co., Butler Road & Industrial Way, South San Francisco, California.

—AE—

DRAFTING—Two illustrated catalogs, one on drafting room equipment and one on furniture, provide a helpful buying guide for drafting machines, bourds and other equipment and offer a complete reference for the selection of drafting room furniture. Both catalogs, "Drafting Equipment" and "Furniture for the Drafting Room," are available from Frederick Post Company, 3650 North Avondale Avenue, Chicago 18, Illinois.

• • • ***Keep Abreast of New Developments with New Literature*** • • •

Mitchell

(*Continued from page* 44)

ing technical personnel runs even higher, similar semi-retirement arrangements could save for us the valuable technical skills of many older men who do not want to leave completely the careers in which they have found interest and satisfaction. This is a possibility that is certainly worthy of consideration.

The more complex the industry of our country becomes, the more important the skill of each American worker is going to be, both in terms of his economic security, and to his country in terms of peacetime prosperity and national security.

There is no simple or single way in which we can raise the level of work skills in our Nation, and surely no way that the Federal Government can or should do it alone. This is a challenge, as I have noted, to every segment of our society, particularly to schools, industry, labor and the local community.

We cannot afford to waste our manpower as we are now doing.

We cannot afford discrimination which wastes the skills of our minority groups.

We cannot afford the pitifully bad schools which plague many areas of this country.

We cannot afford the prejudice and short-sightedness which today are making it increasingly hard for workers over forty-five to find a job.

We cannot afford not to make the most effective use of the 20 million women in our work force.

We cannot afford haphazard and ineffective training programs.

It is the skill, ingenuity, and know-how in the brains and hands of American workmen that have built the sinews of a mighty America. This, together with our spiritual heritage, has made us a great nation. It is my considered opinion that the level of work skills among our working people today has deteriorated dangerously.

We are all greatly concerned with the preservation and development of our national resources. I suggest that the preservation and development of our human resources in terms of work skills is an even greater and more pressing concern and is worthy of the attention of every thinking person in the country. For upon the depth, breadth, and scope of the skills of American artisans may depend the hope of the free world. These critical resources must be cultivated with direction and perspective and we must begin now.—***End.***

About the Author . . .

Mr. Mitchell

Prior to his appointment as Secretary of Labor, James P. Mitchell served as Assistant Secretary of the Army in charge of manpower and reserve forces affairs. During World War II, he was the Director of the Industrial Personnel Division of the War Department where he was responsible for labor and manpower problems affecting Army contractors and the administration of nearly one million civilian employees of the Army Service Forces. During the war, he served as a member of the National Building Trade Stabilization Board and also as an alternate for the Under Secretary of War on the War Manpower Commission.

In 1948, Mr. Mitchell was a member of the personnel advisory board of the Hoover Commission, and in that same year, at the request of the U. S. Army, he went to Germany to study the military government's civilian employment program. In 1950, he was called upon again by the U. S. Army, this time to study and report on combat pay problems.

He has served as personnel relations advisor, Director of Industrial Relations and operating Vice President for several large industrial concerns. He was appointed to his present Cabinet post as Secretary of Labor on October 9, 1953.

Consulting

(*Continued from page* 19)

clients. The converse of this is that if the consultant cannot maintain excellent relations with the clients, then he will loose the clients and will not be able to employ qualified engineers for his staff.

The personality of the engineer can enhance or diminish the prestige of his firm. The business the firm receives is due to a large extent to the day by day contacts of the engineer, and the impression he makes on others. A careful check with our clients clearly indicates that, as far as our firm is concerned, the clients select us for the project, and selection is based upon either the recommendation of a trusted advisor or a personal knowledge of the firm gained through the association with its members in civic groups, social clubs, church, etc., over a period of years.

An example of how an engineer is selected is illustrated by the following case: One of our junior partners graduated in engineering in the same class as the chief engineer of a large industrial firm. Although they were good friends, our junior partner never could get a chance at the engineering work being handled by outside consultants for this firm. One day out of the clear blue, I received a call from the chief engineer, whom I didn't know, to please come to see him the next day. Later when we became good friends I asked why he called me instead of our junior partner. He explained that he had wanted to use our firm, but that his vice president wasn't familiar with our firm. Fortunately for us, this vice president frequently discussed his engineering problem with a well known contractor who told him what he needed wasn't free advice, but professional engineering services and suggested that the vice president get in touch with me. As the chief engineer said, the vice president would have done anything this particular contractor recommended because he had complete confidence in the contractor's advice.

ALL my comments so far have been about entering the private practice by opening your own office. Many engineers have entered the field by becoming partners in existing firms. This procedure removes an element of risk from the undertaking, but it is not always possible to be selected as a partner.

I am sure that many of you know successful consulting engineers who don't meet all the requirements I have listed. By forming a partnership and combining the talents and personality traits of the partners, it is very easy to overcome this handicap. Many firms place a principal in charge of particular phases of the business. For example, one man might be responsible for client relationship, one man is in charge of design, etc.

If you object to working long hours and if you intend to dismiss all the business problems from your mind when you leave your office, don't try to be a consulting engineer, for the problems will be with you twenty-four hours

(*Continued* on page 50)

Letters

(Continued from page 4)

this? Are the "idle pyramids," as Frontinus calls them, engineering or must works do something for mankind to be engineering?

The physician fights disease; the engineer creates something. Is it tenuous, or amenable to definition and understanding?

FRANCIS G. YATES, P.E.,
Colorado Springs, Colo.

NSPE's TVA Stand . . .

Dear Editor:

As a member of the NSPE I realize that it is the function of the administrative body of this organization to express the opinions, which, to their belief, reflect a true evaluation of the available facts. Such a stand is their duty to the members. Nevertheless, President Neff in his letter to Senator Robert S. Kerr has used a very misleading fact as a basis for his opinion. This letter is printed in the September issue and entitled "NSPE Opposes TVA in Outside Engineering Activities."

Whether the TVA should enter into such activities is not the point which I am questioning. Nor am I concerned here about the statement that a Federal agency should not compete with private consulting engineers. Both of these questions would bring up many points of disagreement, even among NSPE members. But the point which was used by President Neff to support his opposition to the preceding questions is a fact that gives an untrue and misleading impression.

This statement, which is repeated four times in the letter, says that because of "compliance with existing state law, designed to protect the public's life, health and property," the TVA should not be allowed to participate in outside engineering activities. The implication of this is that the engineering force of the TVA is unreliable. We, as engineers, pride ourselves on using facts to arrive at decisions. Mr. Neff would not say that the engineers of the TVA are not competent. Consequently he should not use such hidden implications as facts to support his opinions. I feel that in attempting to sustain his statements Mr. Neff resorted to a fact which gave an untrue implication. . . .

GENE M. WILHOITE, P. E.,
Chattanooga, Tenn.

► Mr. Wilhoite's letter was referred to Mr. Neff, who commented as follows:

"There was no implication intended that the engineering staff of TVA is incompetent. We have no basis for such an allegation or implication and disavow any such intention. The point remains, however, that the competency of professional engineers providing services to the public is for the determination of the public bodies lawfully designated for the purpose —the state engineering registration boards—not for any individuals or private associations. The underlying justification for all state engineering registration laws is the protection of the public's life, health and property. And the further fact remains that despite the competency of the engineers in TVA, the Government agency, as such, has not been recognized or certified under the state engineering registration laws. Therefore, if it provides engineering services outside of its own organizational responsibilities it will be in violation of the spirit, and perhaps the letter, of the applicable state laws."—*Editor.*

CLASSIFIED ADVERTISING

Minimum 3 lines.
Undisplayed: $1.50 per line.
Displayed: Same rate as General Advertising.

Positions Wanted: Undisplayed, 75c per line. Displayed, 50% off General Advertising Rates.
Box Number chargeable as one line.

Mail Box Number replies to:
AMERICAN ENGINEER
1121 15th St., N.W. Washington 5, D. C.

Courses, Training

ENGINEERS
Learn Construction Management

Complete course in the practical "know-how" of organizing and directing large projects on construction. For sample lessons and full particulars—write:

GEO. E. DEATHERAGE & SON
Construction Consultants
411—5th Ave. So. Lake Worth, Fla.

Positions Available

CIVIL ENGINEER—For Asst. City Engineer position. Must be P.E. with experience in construction and design. Civil Service tenure. Salary $645 to $724 per mo. Max. age 50. For details write to Civil Service Office, City Hall, Dearborn, Michigan.

Architect or Engineers—Experienced graduate to supervise school construction for architectural firm. Either resident position or one with considerable traveling in connection with several projects. Throughout Michigan or within 100 mile radius surrounding Chicago. Salary dependent upon qualifications. Give summary of education and experience, with salary expected. Box 904A, AMERICAN ENGINEER.

Bridge Designer with at least four years experience in designing highway bridges for work in General Office of State Highway Department in Rocky Mountain Area. Give summary of experience and training and minimum salary acceptable. Address reply to Box 901, AMERICAN ENGINEER.

Business Opportunity

Civil Engineering and Surveying business, firmly established. Located Florida West Coast metropolitan area. Grossing approximately $100,000 annually, can be tripled. Excellent location; commodious offices. Investment will pay out of earnings in three years. Qualified persons please contact Box O-902. AMERICAN ENGINEER.

Placement Service

The following positions are listed with The Ohio Engineers' Placement Service, Inc., address below:

Positions Available

CONSULTING ASSOCIATE Grad CIVIL Engr. Age 45-50. On associate basis with two Consultants who wish to expand their services. Must have some consulting exp. plus a good background as Chief Engineer, Highway Dept., or with a firm as a partner. One who commands prestige in his specialty and possesses a record of accomplishments in the field of Highway Engineering, Structural Engineering, and if possible strong on Expressways and Freeways. (336-N-1)

MECHANICAL-ELECTRICAL Engr. This is a supervisory of maintenance position —of property & machinery. Also supervision of installation of new equip. Two fine hotels have 700 rooms completely air-conditioned; a good knowledge of air-conditioning is necessary. Because of the diverse nature of their maintenance problems, it is essential that they have a man that is good at systems and methods. Some designing ability is required. The salary will be in the neighborhood of $10,000 to start but there is room for salary improvements commensurate with results. (335-N-1)

(Small service charge)
THE OHIO ENGINEERS' PLACEMENT SERVICE, INC.
5 East Long St., Columbus 15, Ohio
Affiliated with OSPE

CIVIL ENGINEERS

Graduate Civil Engineers not over 27 and single, or if married, willing to move. Must have military training completed and interested in learning the building construction business starting in the field. We offer opportunity for rapid advancement to ambitious, hardworking young men willing to accept responsibility. Starting salary $92.50 per week if unexperienced with higher rates for those with experience. Some engineers increase their salary 20% within one year. Send complete history data.

Martin K. Eby Construction Co., Inc.
610 North Main Wichita, Kansas

HIGHWAY AND BRIDGE

Engineers
Designers
Draftsmen
Field Survey Personnel

Openings currently exist at
Rochester, Penna.
Harrisburg, Penna.
College Park, Md.
Dania, Florida

Write giving full particulars concerning education, experience, personal history and availability, to:

Richard L. Shaw,
Personnel Director
MICHAEL BAKER, JR., INC.
Consulting Engineers
Baker Bldg. Rochester, Pa.

Books

NATIONAL PLUMBING CODE *ILLUSTRATED*

by Vincent T. Manas, P. E.

The only illustrated guide to the widely accepted Standard ASA A40.8 National Plumbing Code.

An invaluable aid in your plumbing design.

To: Manas Publications
4513 Potomac Ave., N.W.
Washington 7, D. C.

Send me ..... copies of "National Plumbing Code Illustrated" @ $4.00 per copy.

Check enclosed.

Name .....

Address .....

City ..... Zone ..... State .....

What's New

AMERICAN ENGINEER Oct., 1955
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 1 to:

Name ..... (Title)
Company .....
Street .....
City and Zone ..... State .....

ELECTRIC BASEBOARD HEATER — Item 1

A new electric baseboard heater is available from Westinghouse Electric Corporation. Meets the requirements of any climate. Economical to install, operate and maintain. Units are installed along the wall in place of baseboards, and provide heat both by radiation and convection. Can be operated with furniture placed flush to them or with draperies hung above and against them. Maximum temperature of the vertical outer surface is approximately 100 degrees F. Installed in two-foot sections. A control panel in each room allows room-by-room use and conservation of heat.

AMERICAN ENGINEER Oct., 1955
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 2 to:

Name ..... (Title)
Company .....
Street .....
City and Zone ..... State .....

PVC FITTINGS AND FLEXIBLE TUBING — Item 2

Tube Turns Plastics, Inc., has introduced a new line of instrumentation fittings made of unplasticized polyvinyl chloride and, for use with them, corrosion resistant flexible tubing. Especially useful where corrosive atmospheres exist. Can be advantageously employed in the instrumentation of chemical plants, hospitals, experimental laboratories, and in food, drug and beverage processing. Permit an entire assembly to be put together by hand without the aid of wrenches, flaring or bending tools, or stretchers. No sleeves or ferrules are involved. Additionally, the expense of wrapping or coating metal tubing, where it is exposed to corrosive attack, is eliminated.

AMERICAN ENGINEER Oct., 1955
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 3 to:

Name ..... (Title)
Company .....
Street .....
City and Zone ..... State .....

NEW OPTICAL TRANSIT — Item 3

WILD Heerbrugg Instruments, Inc., announce the New T-1 Repeating Transit with direct readings to 20 seconds and easy interpolation to 10". Available now as an alternative to the standard model T-1 (reading to 1 minute direct, interpolation to 6 seconds), the new model answers many requests received from engineers and land surveyors.

AMERICAN ENGINEER Oct., 1955
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 4 to:

Name ..... (Title)
Company .....
Street .....
City and Zone ..... State .....

PLASTIC STEEL — Item 4

DEVCON, The Plastic Steel, consists of 80% steel and 20% plastic and is now being used for making tools, drill jigs, chuck jaws, nests, and many other items of interest to all industry. Manufactured by the Chemical Development Corporation, it is as easy to handle as modeling clay. No special skill is required. Two hours after the addition of a special hardening agent, the mixture of steel and plastic becomes a rigid, tough, strong, steel-like mass. No heat or pressure is required. Once hard, it can be sawed, threaded, drilled or ground on regular metal-working equipment.

AMERICAN ENGINEER Oct., 1955
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 5 to:

Name ..... (Title)
Company .....
Street .....
City and Zone ..... State .....

MOVING "DOLLIES" CARRY 90 TONS — Item 5

Mighty Movers, a new way to move heavy machinery and other bulky equipment is now available to industries, plants, and warehouses, in the form of sturdy moving "dollies" which carry up to 90 tons. Made by the Mighty Mover Co., the dollies, like giant roller skates, have two 4-inch roller-bearing cast iron wheels set in frames of tough steel. A heavy steel top swivel plate has a standard ½-inch threaded hole to which machinery is bolted after being raised by either a simple mover's jack or a fork lift. Mighty Movers are 9-inches long, 5-inches wide and high, weight 40.

This column describes new products of general interest to professional engineers. For further information, fill in the coupon provided and mail to the AMERICAN ENGINEER.

COMPACT PHOTOCOPIER — Item 6

Photocopies of any office record are said to be made by Transcopy Duplex, in less than a minute without developing, washing, fixing or drying. Makes finished, photo-exact, positive copies of any record, regardless of type or color, from originals up to 14½ wide in any length. The Transcopy Duplex is a two-in-one unit—single machine containing both a printer and a processor. Extremely small, light and compact. Takes not much more space than dictating equipment. No special installation required. Plugged into any electrical outlet. No darkroom needed.

AMERICAN ENGINEER Oct., 1955
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 6 to:

Name ..... (Title)
Company .....
Street .....
City and Zone ..... State .....

ANTI-FREEZE ANALYZER — Item 7

Fleets and construction companies can cut their annual anti-freeze and cooling system maintenance costs in half with a "Zerex" anti-freeze analyzer, recently developed at Du Pont's Anti-Freeze Laboratory. Can determine accurately and quickly which anti-freeze solutions are safe to hold over for another season, and which have become corrosive and thus should be discarded. With this practical Anti-Freeze Analyzer, the reserve alkalinity of any "Zerex"-water solution can be determined accurately, right on the spot. The kit can be used by maintenance men, following printed instructions. The test can be done in two or three minutes.

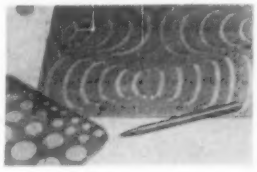
AMERICAN ENGINEER Oct., 1955
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 7 to:

Name ..... (Title)
Company .....
Street .....
City and Zone ..... State .....

TEMPLATES SPEED DRAWINGS — Item 8

A complete assortment of drafting templates, which speed accurate drawings of many engineering shapes and symbols to standard specifications, are now available from E. F. Twomey Co., Inc. Include, drafting templates for electrical and electronic symbols, fluid fittings, full-size nuts and bolts, half-size nuts and bolts, small ellipses, large ellipses, lettering, tooling, circles and sheet thickness. Made of long-lasting, amber-coated vinyl plastic, .025 inches thick. Straight edges, circles, round corners, etc., add to their utility.



AMERICAN ENGINEER Oct., 1955
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 8 to:

Name ..... (Title)
Company .....
Street .....
City and Zone ..... State .....

SNOW MELTING PELLETS — Item 9

Effectiveness of ICE REM, ice and snow melting pellets, is increased by the addition of a new chemical ingredient, according to Speco, Inc. The new element, said to retard rust action and increase storage life, consists primarily of a specially formulated "essential" oil reputed to create a moisture seal within the container and to prevent chemical decomposition. Use of the new ingredient is also said to stimulate action of ICE REM's Speconite phosphate-type rust inhibitor. Consequently, it safeguards against excessive rust in the deicing of metal pipes, drains, downspouts, railway switches, metal loading ramps and curbs. When used on drives and streets, it retards rusting on automobiles, trucks, buses.

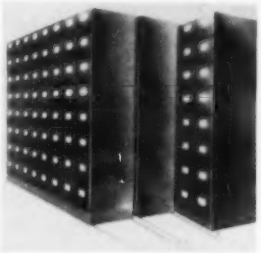
AMERICAN ENGINEER Oct., 1955
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 9 to:

Name ..... (Title)
Company .....
Street .....
City and Zone ..... State .....

MOBILE RECORD STORAGE SYSTEM — Item 10

Dolin's "400" Series steel transfer files are interlocked and mounted on mobile bases fitted with special grease packed ball-bearing wheels, precision machined to allow almost effortless movement of heavy loads. Mobile units are placed in a row on special tracks. Several mobile rows are placed directly in front of a fixed row, each mobile row containing one unit less than the fixed row. Each section of mobile files rolls easily sideways to permit access to rear rows. All files thus become immediately accessible. Decreases the number of aisles necessary, converting to storage.



AMERICAN ENGINEER Oct., 1955
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 10 to:

Name ..... (Title)
Company .....
Street .....
City and Zone ..... State .....

Consulting

(*Continued from page 46*)

a day. If you decide to be a consulting engineer, don't open your office on a part-time basis for this profession requires all of your time.

I am sure that there are probably easier ways to earn a living, but I know of no career that is as interesting and fascinating, as that of a consulting engineer. I have never regretted my decision to open my own office, and I wish the best of luck to those planning to do likewise with the hope that they get as much pleasure out of it as I have. —***End.***

About the Author . . .

Mr. McGaughy

John B. McGaughy, whose advice to engineers interested in entering private practice begins a new *American Engineer series*, is one of the leading young consultants in the South. A civil engineering graduate of Duke University, he is a partner in the Norfolk, Virginia, and Washington, D.C., firm of Lublin, McGaughy & Associates, Architects and Consulting Engineers. His work has included the design of industrial buildings, highways, bridges, sewer systems, and airfields.

Mr. McGaughy is a past president of the Virginia Society of Professional Engineers, and he is now a member of the NSPE Board of Directors. He belongs to the Engineers Club of Hampton Roads, the American Concrete Institute, Rotary, and other organizations.

He is a registered professional engineer in Virginia, Florida, North Carolina, and the District of Columbia, and is also certified by the National Council of State Boards of Engineering Examiners.

Wage-Hour

(*Continued from page 23*)

ing for rural electric cooperatives, The court said that in all of these instances the facilities for which Brown did the design would be used in further functions and operations involving "interstate commerce" or the "production of goods for commerce."

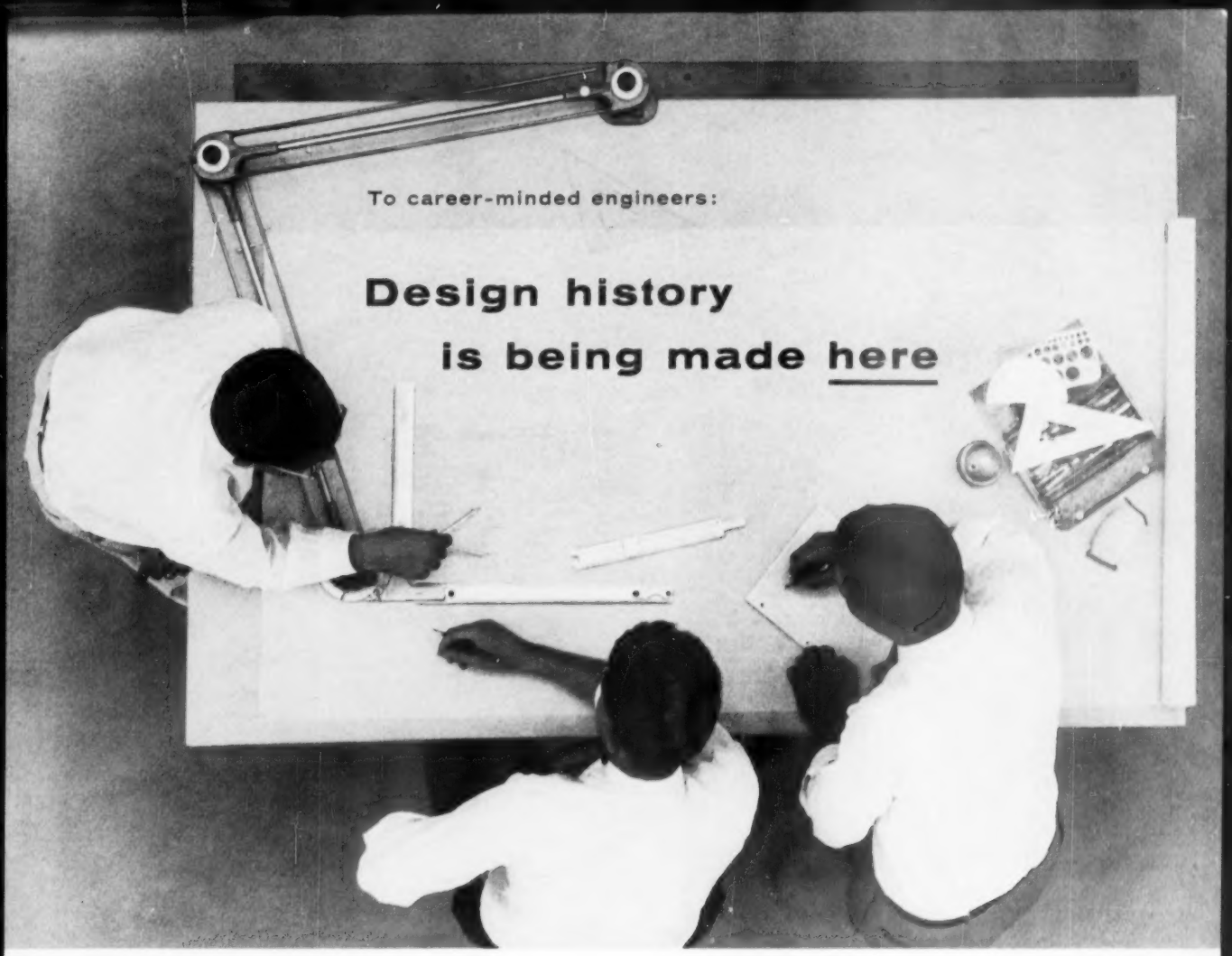
NSPE's "friend of the court" participation in the Supreme Court was agreed to by the attorneys for Brown and by the Solicitor General of the United States because of the important implications of the case to the entire engineering profession. The NSPE brief to the Supreme Court in support of the petition for the Court to hear and decide the case states that "The primary interest of the *amicus curiae* in this litigation lies in the belief that the practice of professional engineering is not business or commerce under the Fair Labor Standards Act. The offer and performance of a professional service is not the ordinary business and commercial operations Congress intended to bring under regulation. . . ."

"The issue here, in essence," the NSPE brief stated, "is whether primarily intellectual, non-standardized and unique services, requiring advanced knowledge and training in a professional field, shall be held in the same classification as normal business and commercial operations." The consulting engineer, the brief said, "is selling not the paper upon which his plans appear, but his specialized knowledge and skill based on professional training and related exclusively to the peculiar problems and needs of the client according to the circumstances."

The next important development in this matter will be an announcement by the Supreme Court as to whether it will agree to hear and decide the appeal.

Advertisers' Index

Acme Fire Alarm Co., Inc. 10
Adache & Case, Engineers 40
Albright & Friel, Inc. 40
Applied Psychology Corp. 41
Ark Engineering Company 40
Michael Baker, Jr., Inc. 40
Elmer S. Barrett Associates 40
E. D. Barstow & Associates 40
Paul Berg 38
Bettenburg, Townsend & Stolte 39
Black & Veatch 39
Norman Boosey Mfg. Co. 4
George W. Brandt, Engineer 40
Roger Barrett Bross 38
Brown & Blauvelt 39
Builders Estimating Service 41
Burns & McDonnell 39
C. L. Calkins 38
Capitol Engineering Corporation 40
Commonwealth Associates, Inc. 38
Consoer, Townsend and Associates 38
Copperweld Steel Co. 10
Crescent Engineering Company, Inc. .. 38
City of Dearborn 47
Geo. E. Deatherage & Son 47
DeLeuw, Cather & Company 38
Martin K. Eby Cons. Co. 47
Engineers Testing Laboratory, Inc. ... 41
Eustis Engineering Company 38
Fairchild Aircraft 7
Eugene K. Falls 38
Fay, Spofford & Thorndike 38
Orrin E. Fenn 38
Ferguson-Gates Engineering Company. 41
Forrest and Cotton 41
Foster & Cafarelli 39
Fraser, Weir & Assoc. 38
Frazier-Simplex, Inc. 40
Freese & Nichols 41
Gannett, Fleming, Corddry & Carpenter, Inc. 40
The Garrett Corporation 9
General Electric Co. .....Cover II and P3
Gustave M. Goldsmith 40
Green Engineering Co. 41
Hall Laboratories, Inc. 41
Alexander Hamilton Inst. 9
Hardesty & Hanover 39
Frank E. Harley & Associates 39
Frederic R. Harris, Inc. 40
The Hinchman Corporation 39
Howard, Needles, Tammen & Bergendoff 40
J. Z. Jizba 39
Kaiser Engineers 38
Kennedy-Riegger Drilling Co., Inc. ... 41
Kirk & Cowin 38
A. C. Kirkwood & Associates 39
Kuljian Corporation 41
Law-Barrow-Agee Laboratories, Inc. .. 38
Lawrie & Green & Associates 41
Lockheed Aircraft Corp. .....Cover III
Lockwood & Andrews 41
Louis J. Lucas 38
Madigan-Hyland 40
Vincent T. Manas 47
Manu-Mine Research & Development Co. 41
Emmet J. McDonald 40
Metcalf & Eddy 38
Merritt & Welker 38
Modjeski and Masters 41
George V. R. Mulligan, P.E. 38
A. L. Munson 39
H. C. Nutting Co. 40
James P. O'Donnell 40
Oklahoma Testing Laboratories 40
John Ostborg 40
Ozalid Division, General Aniline & Film Corp. .....Back Cover
Palmer & Baker, Inc. 38
Parsons, Brinckerhoff, Hall & MacDonald 40
Personalized Gifts Company 10
Radio Corporation of America 10
Revolator Company 4
Cyrus Wm. Rice & Co., Inc. 41
Robert and Company Associates 38
Seelye, Stevenson, Value & Knecht 40
Singstad & Baillie 40
South Florida Test Service 38
D. B. Steinman 40
Sverdrup & Parcel, Inc. 38
Syska & Hennessey, Inc. 40
Tippetts-Abbett-McCarthy-Stratton ... 40
Leonard M. Todd 40
Toledo Testing Laboratory 40
Harry L. Tooker & Associates 41
United States Testing Company, Inc. .. 39
Emerson Venable 41
Warren-Knight Co. 6
Water-Tight Underground Conduit .. 41
Paul Weir Co. 38
Wilton Smith Whipp 41
Whitman, Requardt and Associates .. 38
A. W. Williams Inspection Co. 38
Wilson & Company 38
The Wright Engineers 41



. . . at Lockheed in California

These design engineers are working on the F-104 air Superiority jet fighter.

They are participants in an expanding program that covers virtually every phase of Aeronautical Design. 46 major projects are in progress, including thirteen different models of aircraft already on assembly lines. Aircraft in development include the Electra, first U.S. turbo-prop airliner. Classified activities are equally significant.

There are sound reasons for these Design achievements:

Under Lockheed's Design philosophy, the Design Engineer makes major decisions on engineering problems. He works in an atmosphere of pronounced professional freedom. Original thinking, new ideas are welcomed and rewarded. Moreover, Lockheed emphasizes Design as a field that grows daily in importance.

In career terms, Lockheed's Design attitude and diversified program mean:

More scope for your ability with so many projects in motion; more opportunity for promotion because there are more upper echelon positions; more job security because Lockheed produces such a wide range of aircraft.

To engineers who lack aircraft experience:

Aircraft experience is not necessary to join Lockheed. It's your engineering training and experience that count. Lockheed trains you for aircraft engineering through its Engineering Transitional Program. Naturally, you receive full pay during the Transitional Program.

Lockheed offers engineers: Increased salary and overtime benefits; generous travel and moving allowances that enable you and your family to move to Lockheed at virtually no expense; a chance to enjoy life in San Fernando Valley.

A report on "Maintenance Design of High Speed Aircraft" taken from one of Lockheed's monthly engineering and manufacturing forums is available to interested engineers. Address requests to Forum Chairman J. F. McDonald.

Lockheed's expanding Design program has created positions at all levels in mechanical, electrical, hydraulic, power plant, controls and structures fields. A brochure describing life and work at Lockheed will be sent you upon request. Address E. W. Des Lauriers, Dept. DH-2-10.

LOCKHEED

AIRCRAFT CORPORATION • CALIFORNIA DIVISION

BURBANK **CALIFORNIA**

Avoid overtime with the new Ozalid Streamliner 400–

Detail drawings that differ for various production departments and processing stages... partial tracings for subcontractors and suppliers... pile up the work load for any drafting staff, and often result in overtime, missed deadlines.

With the new Ozalid Streamliner 400, you make duplicate originals of your tracings; and add changes or details on the duplicate originals without doing over basic drawings ...make Ozalid prints, save drafting time and avoid overtime!

This new Streamliner 400 handles sheet or roll stock up to 42 inches, has synchronized printing and developing at speeds up to 24 feet per minute... turns out prints for less than 1½¢ per square foot. Its low price makes it a big economy in any drafting room.

The Streamliner 400 copies anything drawn, typed, written or printed on any translucent original; and prints on a wide variety of sensitized materials–easily, quickly, cheaply. Ozalid whiteprints are delivered dry, exact in size, clear and legible. Even a large print is ready in less than a minute.

Find out how Ozalid's Streamliner 400 can save drafting time and cut print costs in your department. Call any Ozalid distributor (*see phone book*) and ask for a demonstration. Or write 346 Ozaway, Johnson City, N. Y. In Canada, Hughes Owens Co., Ltd., Montreal.

OZALID–A Division of General Aniline & Film Corporation • *From Research to Reality!*

The new low cost STREAMLINER *400 prints on sheet or roll stock... is accurate, fast, convenient...*

OZALID